DOCUMENT RESUME

ED 384 316 HE 028 429

AUTHOR	Morrison, James L., Ed.
TITLE	On the Horizon. The Environmental Scanning Newsletter for Leaders in Education, 1994-95.
INSTITUTION	North Carolina Univ., Chapel Hill. School of Education.
REPORT NO	ISSN-1074-8121
PUB DATE	95
NOTE	82p.; For the 1993-94 newsletters, see ED 371 699.
AVAILABLE FROM	On the Horizon, CB3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599 ($24.50 individual annual subscription; $49.50 organizational subscription; $124.50 site license).
PUB TYPE	Collected Works - Serials (022)
JOURNAL CIT	On the Horizon; v3 n1-5 1994-1995
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Economic Factors; Educational Environment; *Educational Trends; *Environmental Scanning; *Futures (of Society); Higher Education; Politics of Education; Social Change; *Strategic Planning; Technological Advancement; *Trend Analysis
IDENTIFIERS	Internet

ABSTRACT

These five newsletter issues focus on potential developments and critical trends in higher education. Feature articles include: (1) "A Reinvented Model for Higher Education" (Richard B. Heydinger); (2) "Redesigning American Public Education" (James S. Coleman); (3) "Envisioning (and Inventing) the Future" (Ian Wilson); (4) "Human Factors: The Problems of Integrating People and Technology in the Workplace" (Arnold Brown); and (5) "School Is Out--Learning Is In" (Terry O'Banion). Regular columns focus on social, technological, economic, environmental, and political issues affecting higher education, as well as commentaries on higher education issues, the Internet, and computer software. (MDM)

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ED 384 316

ON THE HORIZON
THE ENVIRONMENTAL SCANNING NEWSLETTER FOR LEADERS IN EDUCATION
1993-1994

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On the Horizon

the environmental scanning newsletter for leaders in education

October/November 1994 • Volume 3 Number 1

A Reinvented Model for Higher Education

Richard B. Heydinger
Alliance for Higher Education
University of Minnesota

The "tool box" of higher education change contains mostly tools from the nineteenth century bureaucratic paradigm.

The angst over higher education's future seems more pronounced than ever. Many institutions are working to implement changes. Examples: Syracuse University is placing renewed emphasis on senior staff teaching; Bennington, downsizing its faculty by 10%, has replaced tenure with employment contracts; the 62 campus Minnesota State College and University system is designing an outcome-based, customer driven "product" assessment system intended ultimately to guide its resource allocations.

Admirable efforts, but not enough. Twenty-first century higher education must become mission-driven, customer-sensitive, enterprise-organized, and results-oriented.

To accomplish this mandate is difficult, for the "tool box" of higher education change contains mostly tools from the nineteenth century bureaucratic paradigm. Our reward system drives us toward the criteria of the academic disciplines and often away from our institutional missions. We are confident that we know what is best for students; hence we do not ask alums or employers for their needs. We screen for inputs, not assess outputs. We budget on number of faculty lines, not allocate resources on accomplishments. It is as if we have an electrical problem, and all we have is a plumber's tool box.

We need a new organizational paradigm: one that will focus us on those we serve; allocate resources based on demonstrable success; provide flexibility that will permit timely responses to changing student and research needs; eliminate unnecessary layers of oversight by placing more responsibility with those we serve. This paradigm will provide today's institutional leaders with the tools necessary to "remodel" higher education so that it can meet the needs of the twenty-first century.

If we were to remodel today's higher education system using the tools of this paradigm, what might it look like? The remainder of this article answers this question, in the context of a multi-campus, statewide, public system. However, most of these ideas are equally applicable to the single campus, whether it be public or private.

The Foundation for This Reinvented Model

This reinvented model "unbundles" the current, multi-campus system—separating its functions into a collection of public enterprises. A public enterprise is a corporation, established by the state with a public body as its major stockholder. The enterprises in this model would *not* receive legislative appropriations; instead their

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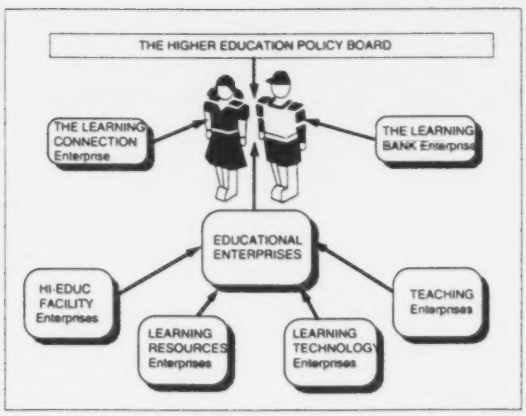
revenues would be earned through contracts for services.

The enterprise organization is no stranger to higher education. Many effective, long established examples exist within the academy. It is not coincidental that they are often the most effective and cost-efficient operations on campus. For example, many continuing education centers are freestanding enterprises. In some institutions the auxiliary enterprises such as dormitories and parking are in actuality enterprise-run units.



Because customer satisfaction will directly affect revenues in our proposed new system, the bottom line will be to provide value to customers. This clear, uncomplicated funding structure guarantees transparent, immediate consequences for success or failure. At last the Gordian knot of competing demands that constrain higher education's continued development can be untied.

Essential to this proposal is a much higher level of systematic accountability. Public scrutiny in this proposal would not be obstructed; it would be enhanced. With a reliance on judgments by customers, which in turn would influence funding, public accountability would at last be fully obtained.

With a reliance on judgments by customers, which in turn would influence funding, public accountability would at last be fully obtained.

A Family of Public Enterprises

Our reinvented model vests in a Higher Education Policy Board the final responsibility for ensuring that high quality, value-rich higher education is being delivered to the public. Organizationally this Board would be similar to the statewide coordinating boards of today. However its responsibilities would be much different.

The Policy Board would focus clearly and exclusively on the outcomes of service and the needs of the customers of higher education. The Board would be responsible for reviewing performance across the entire system, setting broad policy, ensuring that values such as equity and access were being fulfilled, and developing incentives consistent with the overall objectives of the system.

The Policy Board, however, would not develop detailed policies or a long list of operating guidelines for the other enterprises, leaving those to the talent, ingenuity, and professional expertise of those operating each enterprise. Each of these enterprises would be chartered by the Higher Education Policy Board with a specific mission and focus.

Operating under the Policy Board umbrella, each enterprise would be a public corporation, separate from the others, mission-focused, and directly accountable to those they immediately serve. Nearly all of these enterprises have a counterpart within today's higher education system. Some of the enterprises are new; all reflect a new focus, with new emphasis on accountable delivery to students. Below are examples.

A Learning Connection would assist students in making choices about their educational options and would evaluate the performance of each educational program in the system. The Learning Connection would act in an advocacy role to assist students sort options available by providing them with comprehensive, user-friendly evaluative information on educational programs.

A Learning Bank would maintain an individual postsecondary education account for each citizen in the state. All financial aid, individual savings in anticipation of higher education bills, and state appropriations supporting student attendance would be held here. Under state developed guidelines, citizens could use these funds to pay for their postsecondary education.

Together the Learning Connection and Learning Bank would combine to give students two enterprises focused exclusively on their best interests, not the institution's, and to advise students in making both enrollment and payment-for-education decisions.

Educational Enterprises are the centerpiece of this proposal, for they would be the most visible and most recognizable part of the system to the student. Students would enroll here. Rather than employing faculty and staff or owning facilities, Educational Enterprises would purchase instructional services, would contract for academic support, and would rent facilities from other enterprises.

Teaching Enterprises, collections of faculty members to provide instructional services to one or more educational enterprises, might focus on a discipline, problem, field of interest, type of student served or pedagogical style. These organizations might be public corporations, private entities or even single individuals.

Each teaching enterprise would set its own guidelines with regard to teaching loads, research and other policies. Faculty could be tenured or contracted in these organizations, depending on the decision of the particular Teaching Enterprise.

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FROM THE EDITOR

James L. Morrison
On the Horizon
The University of North Carolina at Chapel Hill

Responses to "A Reinvented Model for Higher Education" from the '*List*

We now have over 700 participants on *Horizon List* accessible through Internet. One use of the *List* is to stimulate conversations on emerging trends and potential developments that may affect education by posting draft *On the Horizon* articles for discussion, critique, and comment. Below are brief excerpts (somewhat paraphrased) from several *List* participants who commented in response to our lead article. The thoughtful and thought-provoking responses are available in their entirety in *Horizon List* archives.

• *From Merrill Pritchett, University of Baltimore:* Heydinger replaces the heavy hand of an unresponsive bureaucracy by unbundling established higher education organizations to create "enterprise organizations." I am struck by how serious writers rely on the functioning of the marketplace to reform higher education. Could not models for reinvented higher education be drawn from environmental studies or developmental psychology? Would not a student-centered model of higher education be even more revolutionary?

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On the Horizon focuses on potential developments and critical trends affecting education. It is published in October/November, December/January, February/March, April/May, and June /July by the Institute for Academic and Professional Leadership, School of Education, The University of North Carolina at Chapel Hill. ISSN 1074-8121. Annual cost: individual, $24.50; organizational, $49.50; site license, $124.50. For more information, contact Professor James L. Morrison, Editor, *On the Horizon*, or Assistants to the Editor, K.C. Brown, Robbi Pickeral, or Clari Terrill, CB# 3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599. (919) 962-2517. Internet Morrison@unc.edu.

The Institute for Academic and Professional Leadership serves educational leaders by providing professional development workshops and seminars. For more information about the Institute, its facilities, and its services, contact William S. Pate, Program Director, The Friday Center, CB #1020, UNC-Chapel Hill, Chapel Hill, NC 27599. (919) 962-3276. Internet iapl@unc.edu.

The *List* offers an opportunity to join in a worldwide discussion/ critique of emerging trends and issues published in *On the Horizon.*

We hope to get even more information from the *List* in the future via our venture in establishing a global electronic environmental scanning database on the Internet.

...A successful business is one that meets present customer needs while at the same time planning to meet needs that the customer does not yet even dream of. The classic example is the VCR. Developed by an American company, it was dropped for lack of immediate markets, only to be picked up by a Japanese company that spent 20 years developing the market (i.e., getting consumers to see the need for it), and then made millions. Higher education should try to meet the present needs of students, as narrowly they are now defined, while not giving up the broader aims of education. If we regard education as a life long process, persuade our students of the truth of the idea, and practice it ourselves, we might be able educate students who can cope and be successful for the long haul as well as the first job.

...Maybe the most important *core competency* of higher education is encouraging our people to think creatively, to experiment, and to try to shape the future. We must keep in mind that writers on core competencies stress that what is an asset today must be reexamined constantly, taking into account the possible future impact of technological, demographic, and economic trends.

• *From David Ross, Houston Community College:* I wish we could read an article on education without words like *reinvent, paradigm, outcome, customer needs.*

Outcome in its most common collocation as in *measurable outcome* thrills legislators and chills educators. Here in the trenches comes another taxpayer subsidy of the educational testing, database management industries.

• *From Don Mencer, Aurora University:* Training for specific jobs will leave our students less prepared for the future, not more prepared. Perhaps if we did a better job of explaining why the liberal arts curriculum is valuable, the customer would be happy to pay to acquire it.

• *From Dean Pielstick, Chemeketa Community College:* The SCANS reports call for exactly the kinds of competencies that one develops through a liberal education. During customer conferences, local business leaders say that they have to provide specific technical training; they expect our graduates to be able to solve problems and think critically.

* * *

If you have not yet subscribed to *Horizon List,* please consider doing so (instructions are in the June/July 1994 issue). The *List* offers an opportunity to join in a worldwide discussion/critique of emerging trends and issues published in *On the Horizon.* Moreover, we use these discussions as a way of identifying potential articles. Indeed, some of the articles we have published stemmed initially from the discussion on *Horizon List* as well as from other lists we systematically scan.

We hope to get even more information from the *List* in the future via our venture in establishing a global electronic environmental scanning database on the Internet. Now when you subscribe to *Horizon List,* part of the welcome announcement tells you the format for your posting and how to retrieve information from the database.

The usefulness of this database is dependent upon *List* participants—the more who contribute, the richer and, therefore, the more useful the database. We intend to mine this database for potential items for publication in *On the Horizon;* if we select your contribution, we will request your permission to publish it, giving, of course, due credit to you for your contribution.

A Reinvented Model for Higher Education

continued from page 2

The Teaching Enterprise is often viewed as the most radical part of this proposal, for instructional resources would now be "outsourced." However, this change could yield some important benefits. It would disentangle competing objectives inherent in today's multifaceted, "fuzzy" mission system.

The change would give each educational enterprise greater freedom to set incentives tailored to its particular customers. For example, an Educational Enterprise might demand in its contract with a Teaching Enterprise that senior faculty teach more introductory courses.

Similarly, a Teaching Enterprise would be free to take on as many research contracts as it wished or to reach out in specialty areas, far beyond today's implicit mission boundaries. If a Teaching Enterprise judged that it needed better library support to meet the needs of *its* customers, it could write this into its contract with the Learning Resources Enterprise.

The Learning Resources Enterprise would own and operate library resources including the full panoply of services and resources characterizing today's library. Both Educational Enterprises, on behalf of their students, and Teaching Enterprises, on behalf of their faculty, could contract with the Learning Resources Enterprise for services. However, a Learning Resources Enterprise would also have an incentive to contract with other groups in the community, thereby generating additional revenue and extending accessibility of these valuable resources.

This reinvented model should *not* be seen as a privatization model.

In the next issue, James Coleman, University of Chicago, will focus on a model for reinventing public education.

The Learning Technologies Enterprise would provide computing, telecommunications, and multimedia services. The primary customers of this entity would be students and faculty; it would have performance contracts with Educational Enterprises and Teaching Enterprises respectively.

The Facility Enterprise would operate and maintain all buildings system wide, with the goal of producing the best possible return on these valuable public assets. Although Educational Enterprises would be their primary customers, there would be strong incentive to use these buildings and grounds more creatively so that citizens would get a larger return on their investment in these assets.

A Few Cautions in Interpreting This Proposal

This reinvented model should *not* be seen as a privatization model. Replacing a non-customer oriented public bureaucracy with a private one that simply reports to a public board does not necessarily improve service. In fact experience shows that such changes can easily *decrease* the level of service. Essential to the success of this model is the freedom for each Educational Enterprise to choose amongst both public and private providers in developing the range of programs and services it will offer students.

Second, the performance of these enterprises must be completely open to public review and comment. The effectiveness of an enterprise will be apparent from the size and diversity of its revenue streams. Budget size can be determined by each enterprise's ability to provide high quality service at a good value in the eyes of its customers, not by its political might to plead a convincing case before the legislature.

This reinvented model is certainly not the only approach to responding to the challenges facing higher education, nor does space permit a fuller discussion here of this model. Those wishing more information about this proposal, including a fuller description of each enterprise, a discussion of how this model would operate on a day-to-day basis, or some suggestions of how to implement these enterprises should consult the complete proposal.

[Editor's note: Copies of the proposal from which Professor Heydinger drew this article, entitled "A Model for the Reinvented Higher Education System" (publication PS-94-1), are available from SHEEO for $10 each by calling (303) 299-3686. In the December/January issue, James Coleman, University of Chicago, will focus on a model for reinventing public education.]

SOCIAL

Lois Graff
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The Monster Under the Bed

The central propositions of Stan Davis and Jim Botkin's new book, *The Monster Under the Bed*, are that (a) the marketplace for learning is expanding from the traditional K-12 plus college to a demand for lifelong learning, and (b) the incremental demands created by this expansion are being better met by businesses than by schools.

According to Davis and Botkin, "In the information economy, the rapid pace of technological change means that education must be updated throughout our working lives....Lifelong learning is the norm that is augmenting and in some cases displacing school-education" (p. 16).

If these propositions are true, they imply an unprecedented competitive challenge for American institutions of higher learning. The challenge is to adapt, to "shift" some fundamental paradigms.

Many factors contribute to the growing need for lifelong learning in a continuous learning environment. The rapid growth of information and communications technology has led to the understanding of knowledge as a product itself. We can create an iron, for example, that can turn itself off when it is placed in the "wrong" position or copy machines that can indicate where the problem is or automobiles that can signal when service is due. The data generated by the products become an added value which generates a competitive advantage. Smart businesses hire employees and seek customers who recognize and implement these knowledge-based ideas. Increased competition both globally and domestically is challenging firms to function more productively and more effectively, to learn how to "leverage the economic value of knowledge."

A basic tenet of lifelong learning is collaboration. This requires a more educated workforce that sees itself in a decision making role and understands a larger part of the operation.

The authors point to the confluence of the growth in technology, awareness of quality principles, and increased global competition as causes for shorter product cycles in all fields. It is becoming necessary to bring new products to market more quickly at the same time that the life cycles of existing products grow shorter.

Davis and Botkin cite numerous businesses that have invested large amounts of capital in developing successful educational systems, sometimes even calling them universities. The authors cite statistics indicating that the number of corporate employees receiving formal training in 1992 grew by nearly four million people or about 126 million additional hours of employee learning in

Corporate-based learning is often aided by a huge investment in technology to deliver content expertise.

Switching the focus from teaching to learning also implies that we as educators must better define desired learning outcomes and develop more innovative ways to assess whether or not learning has occurred.

one year, the equivalent of almost a quarter of a million additional full-time college students: this is a growth that the educational sector is hard pressed to meet.

Further, corporate-based learning is often aided by a huge investment in technology to deliver content expertise. Networks and multimedia systems with self-paced and just-in-time training readily available are able to move the educational focus from teaching to learning; educators are just beginning to recognize this as critical to preparing someone for lifelong learning.

Davis and Botkin place the major responsibility for the kind of education that is necessary for any country to remain competitive in the new economy squarely on the shoulders of business, not academe. Corporations face a growing need for educated employees, and there is already some resistance to paying a premium for MBAs. As companies bring learning in-house, the value of graduate degrees continues to decline. Companies may even choose to recruit directly from high school into their ranks.

Traditionally, companies have been paying a great deal of attention to cultural diversity because, according to Davis and Botkin, of "the need to integrate a workforce diversified by race, gender, and national origin." Attention is given to improving communication and interpersonal skills because this is of value to the company. Even issues of social and moral responsibility become fair game for the corporate educator.

[Davis, Stan & Botkin, Jim. (1994). *The monster under the bed.* New York: Simon & Schuster.]

Implications

Davis and Botkin agree that corporations are not going to displace schools and colleges for basic learning. However, corporations are likely to have some profound effects on what education we provide and how we provide it.

How should educators respond? It is no longer possible to dismiss corporate education as merely "training" in the most narrow sense of that word—delivery of highly specialized facts or skills.

Collectively, colleges and universities along with business must identify what it is that each can offer efficiently to achieve a higher quality education. This is not merely a matter of colleges offering courses subsidized by corporations. Nor should educators tailor courses designed to help their graduates land jobs. Rather educators must accept the fact that learning is a lifelong process; educators must help students see the connections between what is happening in "school" and what is happening in life, and must broaden the students' appreciation for why and how a course in philosophy or art or anthropology is "useful."

In this process, each institution of learning must delineate what it can do better than other institutions. In the jargon of business, what is each institution's comparative advantage? Increased partnering both among academic institutions and between universities and corporations is necessary. Integration of providers is the key to preparing and presenting a complete package to the student.

Switching the focus in schools and colleges from "teaching" to "learning" requires placing more responsibility on students for learning content-based material outside of the standard lecture. Merely assigning chapters in a textbook is no longer acceptable. Students should also be provided with information on how they learn best and most easily in a way compatible with their individual learning style.

Students should have access to tools that will help them learn, the same kind of technology that is available in corporations today (here's one place where a respectful partnering might really benefit a university). They should be allowed and encouraged to use all possible sources of information. Davis and Botkin cite the example of the use of calculators being discouraged in classrooms for a long time even though everyone agreed they were more efficient and more accurate. Another example is the restriction on using a fellow classmate's research paper; such papers should be stored in an electronic library and failure to access and properly attribute such information should be downgraded. Students should be taught how to work collaboratively and to exchange ideas and knowledge with their fellow classmates.

Switching the focus from teaching to learning also implies that we as educators must better define desired learning outcomes and develop more innovative ways to assess whether or not learning has occurred. This will probably lead away from our artificial adherence on regular class meetings, with a fixed number of contact hours as the definition of a course. The traditional model is not functional in a world of technology with adult learners.

Reassessing the teacher-student relationship leads to reassessing the schools themselves. Do traditional schools and colleges fit the new learning needs? Are there new issues in serving the new "market"? Must some new academic/corporate entity be created?

Davis and Botkin raise many provocative questions. In general, business schools are further ahead than other academic institutions in examining how corporations and higher education can work together, but even they have not seen corporations as competitors in education. Perhaps it is time to turn on the lights and examine this "monster under the bed."

TECHNOLOGICAL

Wally Albers
Albers Systems, Inc.

New Addition to the Endangered Species List: "On the Job"

Many organizations are already well on the path toward being "dejobbed."

The social entity known as a job is "vanishing like a species that has outlived its evolutionary time," says William Bridges in a recent *Fortune* article. Advances in technology have automated the production line and all but eliminated traditional repetitive tasks. Jobs have become rigid solutions to a dynamic problem. "We can rewrite a person's job description occasionally, but not every week," says Bridges. Jobs are no longer socially adaptive. Regular hours, strictly prescribed duties, unvarying pay—characteristics of the traditional job—no longer fit the work needs of contemporary economies. According to Bridges, many organizations are already well on the path toward being "dejobbed." Workers are most likely to be assigned to a project where their responsibilities and tasks evolve and keep changing as the project evolves and changes. Even before finishing the first task, workers are reassigned—under several different team leaders, keeping different schedules, changing locations and performing a wide variety of tasks. Skill requirements of the emerging workplace are more general than specific, crossing traditional disciplinary lines and leaning much more towards flexibility and resiliency than to the rigid norms of the traditional "job." [Bridges, W. (1994, September 19). The end of the job. *Fortune*, 62-74].

Implications

In the changing world of the vanishing-job concept, the packaging of education could be adjusted to better meet contemporary work needs. Just as work requirements packages are no longer focused on regular hours, strictly prescribed duties and inverting pay, educational packages should be designed to prepare students for less strictly prescribed duties and greater flexibility and resiliency in their pursuit of knowledge and technical training.

The Phenomenal Growth of Digital Science

The virtual laboratory will become as important a part of the science student's course work as the traditional laboratory experience.

Digital science, science on a computer, has experienced remarkable growth over the last ten years, in both capacity and speed, providing greater capability for the solution to increasingly complex problems. Now computers can "reengineer almost anything in Mother Nature's pantry," says Russell Mitchell in a *Business Week* article on science and technology. This puts computers at "the cusp of all scientific endeavors." Mitchell claims that "digital science marks the most fundamental change in scientific methodology since Newton." Quoting a California physicist: "It's the transcendent technology of our time." Although such grandiose statements are debatable, there is a germ of truth in all of this. Experimental digital science, carried out in virtual laboratories, is enjoying success after success in such diverse scientific arenas as computational biology, modeling of the combustion process, simulation of materials, global climate modeling, and fusion-energy reactors, to mention a few. One truism emerges: Digital science is able to pick up where the imagination leaves off, vastly extending scientific vision. [Mitchell, R. (1994, September 19). Fantastic journeys in virtual labs. *Business Week*, 76-88.]

Implications

Science delivery is becoming more and more computer-intensive. Educators must rethink how to teach science. The virtual laboratory will become as important a part of the science student's course work as the traditional laboratory experience. Prepare to budget accordingly.

ECONOMIC

A. G. Kefalas
Department of Management
University of Georgia

Global Competitiveness

Since 1985 the United States of America has been down in the dumps about its economic performance, at home and in the global marketplace. At home the country experienced a huge loss in competitiveness (i.e., the ability of national business to ward off foreign competition). Foreign manufacturers had captured a substantial portion of the U.S. market, causing turbulence in corporate board meetings, and stimulating a frenzy of reorganizing, restructuring, downsizing, rightsizing and reengineering.

Abroad, low quality and high prices were the usual reasons given for the inability of American businesses to maintain existing markets and to gain new ones. American business attributed this loss of global competitiveness to a "wimpy" U.S. industrial and foreign trade policy and to the high value of the dollar. Economists reminded business and government leaders of the J-curve effect. Changes in government policies and business structures tend to follow a lagged path similar to the tail of the letter J. At the beginning of the change it appears that there is no real effect on the business activity both in terms of output and trade. Contractual arrangements prevent any immediate effect on production and demand. After a reason-

Economic recovery is becoming apparent in a great number of the OECD countries.

Despite this economic growth, unemployment will continue to be a problem.

During the lean last ten years, educational institutions had to bite the bullet as much as, if not more than, both governments and private businesses did.

able time eventually the change does kick off a process of output and trade creation.

Recent events appear to have again proven the economists correct. Two related reports have elevated the U.S. to the top of the world again for the first time since 1985. The first report places the U.S. at the number one position in global competitiveness. The second one reports a brilliant economic performance for 1994 and forecasts an equally optimistic outlook for the coming year.

Last month the Swiss-based Institute for Management Development and the World Economic Forum issued their World Competitiveness Report, which placed the U.S. at the top of the global competitiveness list. Although the U.S. has been the laughing stock for years, the global community admitted that the U.S. is now successfully competing with its traditional rivals Japan and Germany who are placed third and fifth respectively. Within Europe, Germany, Switzerland and Denmark top the list (Francis, 1994).

The report defines competitiveness as the ability of a country or a company to generate proportionally more wealth than competitors do in world markets. Countries are ranked in such areas as domestic economic strength, infrastructure and management, on the basis of 381 criteria that range from computers per capita to alcohol and drug abuse. The U.S. excelled in a strong and early economic recovery, coupled with high scores on entrepreneurship, internationalization and financial vitality. Japan, which systematically led the world competitiveness scoreboard for the past eight years, has slipped to the third place, behind Singapore, due to its "worst economic recession, as well as a growing mistrust of the political system" (Butler, 1994).

The OECD Economic Outlook

The Council of the Organization for Economic Cooperation and Development (OECD) met on June 7-8 at the ministerial level. OECD, aka the Rich Countries Club, includes the world's top 24 countries plus the newest member, Mexico. The consensus of the meeting was that economic recovery is occurring in a number of OECD countries. The annual OECD *Economic Outlook* begins its current report with the statement, "Economic growth in the OECD area as a whole is steadily gathering strength. OECD activity will expand by over 2.6% in 1994 and close to 3% in 1995" (OECD, 1994). As is customary, economic activity is measured by a country's performance in the following four areas: (a) growth of real Gross Domestic Product (GDP) (b) unemployment (c) private consumption deflator or inflation and (d) current balance. In the first three measures the U.S. receives straight As. In the last area, the measure of a country's net result of its international transactions, the U.S. receives the usual C-minus.

Growth of real GDP will average 2.6% in 1994 for all OECD countries. For the so-called G7 that counts for 84.6% of the OECD total output, the growth rate will be 2.7%. The U.S. tops the list of G7 countries and shares this position with Denmark and Australia. Only Ireland and Norway are expected to grow faster with 4.1 and 4.3 % respectively. For 1995 the G7 will grow at 2.9% while the U.S. will average 3.0% The engines of development for 1995 will place Canada with 4.3%, the United Kingdom 3.2% and the U.S. with 3.0%.

Despite this economic growth, unemployment will continue to be a problem. In 1994 unemployment will average 7.4 % for the G7 countries and 8.5 % for all OECD countries. (Luxembourg, Japan and the U.S. have the lowest unemployment rates for these countries with 2.7%, 2.9% and 6.3% respectively.) The European Union (EU) countries top the list having the most unemployed people—12% of the labor force. For 1995 a slight improvement is forecast to the tune of .3% for all OECD countries.

Price changes (i.e., inflation) will remain at a very low level for 1995 for the G7 countries—2.0% and 3.5% for the OECD as a whole, minus Turkey, which may experience 106% inflation. The U.S. will be around 2.1% while the EU countries will average 3.1%. For 1995 the U.S. will have the largest increase in inflation (1% above the 1994 level), while the G7 countries will remain close to the 1994 level with an increase of 2.3%. The EU will improve its position by experiencing a decline in inflation from 3.1% to 2.5%.

Australia, the U.K, Canada and the U.S. lead the OECD in the current accounts deficits for 1994 and will continue to do so for 1995. Australia is the leader in this area with a deficit of 3.9% of its GDP for 1994 and 4.3% for 1995. The G7 countries have a deficit of .1% for 1994 and will experience a slight deterioration for 1995 to .2%. Switzerland tops the list of winners in the international transactions game with a surplus of some 7.3% for 1994 and 6.8% for 1995. The Benelux countries are other winners with fairly large surpluses for both the current year and 1995.

[Butler, Chris. (1994, September 1-15). The frontrunners in a race for world trade. *The European*, 27; OECD. (1994, August/September). OECD economic outlook, *The OECD Observer*, No. 189; Williams, Francis (1994, September 7). U.S. displaces Japan as most competitive nation. *Financial Times*, 1, 4.]

Now is the time for the administrators, their staff and the faculty to pull up their sleeves and start working.

Implications

The Council of OECD Ministers issued a policy report that covers a wide range of recommendations aimed at facilitating the sustainability of the improved growth rates. To reduce chronic unemployment they suggest that "the aim should be to establish the conditions most conducive to innovation, private initiative and creation of large numbers of jobs at all skill levels and to ensure that people are equipped to take these jobs." Recognizing that education is the most obvious vehicle to provide the skills needed, the Council advised governments to seek "further to improve education and training systems, in each national institutional context, and where appropriate, in close cooperation with social partners, local authorities and private initiatives, so as to ensure that people can, and throughout their lifetime, will develop their knowledge and skills, thereby contributing to improved productivity and sustained high level of growth."

During the lean last ten years, educational institutions had to bite the bullet as much as, if not more than, both governments and private business did. School administrators were told that plans for construction of new schools and lab facilities, for hiring new faculty, for acquiring new technology, for starting new curricula, all had to be put on a freeze "till the economy picks up." Low growth rates or no growth at all create problems for state budgets. Revenue fell while appropriations remained the same and even grew to accommodate people who lost their jobs.

Now that this country is back at the top of the economic growth curve and seems to have gotten its act together both locally and globally, it should be reminded that it got there because of the superior knowledge and skills of its people. Academic institutions are the knowledge and skills-creating machinery of this country. Like all other systems, the educational system needs a substantial overhaul. Now is the time for the administrators, their staff and the faculty to pull up their sleeves and start working toward sharing this economic bonanza that the great growth machine is creating.

ENVIRONMENT

Douglas J. Crawford-Brown
Department of Environmental Sciences and Engineering
University of North Carolina at Chapel Hill

By linking the geosciences to human ecology, educators can prepare students for a meaningful role in solving environmental problems.

Geo Science, Environmental Studies & Social Organization

Social organization is essential to the survival of the geosciences and environmental studies. Educators must apply social organization to address these related fields on three levels: between departments at universities and colleges, between separate groups of educational organizations, and between academia, industry and national scientific organizations.

All education in environmental studies must begin with a firm grounding in the various geosciences. The laws governing physical, chemical and biological processes moving matter and energy through environmental systems must be studied with rigor. But a rigorous education in each of these processes is beyond the scope of individual departments as they now exist. Both rigor and "completeness of conception" are needed if students are to grasp environmental phenomena intellectually rather than merely mechanically and piecemeal. Departments must be organized into a collaborative group, each bringing the tools of analysis from its particular disciplinary perspective while collectively providing a sense for the overall cosmology of an environmental phenomenon. The challenge is to balance the need for thorough preparation in a specialized area of geoscience equally with the need for a thorough understanding of the evolving issues towards which specialized understanding must be directed.

The hope for the future lies in the exchange of materials through interinstitutional collaboration and electronic media. Individuals must make their teaching aids and expertise available at other institutions. The World Wide Web (WWW) can provide support in organizing teachers and non-academic groups separated widely by space, discipline and resources.

At a recent American Geophysical Union conference on "Scrutiny of Undergraduate Geoscience Education: Is the Viability of the Geosciences in Jeopardy?" participating organizations welcomed interactions with others interested in joining or simply making use of the available materials. (Contact the AGU offices at 2000 Florida Avenue, N.W., Washington, DC 20009 (202-939-3203) for a copy of the proceedings.) The availability of interdisciplinary environmental materials is stunning in scope, in the quality of graphical displays, and in their potential to bring greater intellectual rigor to environmental analysis.

Most of the collaborative programs were designed to draw on disciplinary strengths while providing a broader perspective on environmental phenomena and issues. This broader perspective includes the role of social organization in understanding the contribution of humans to environ-

Social organizational collaborations are the hope of the future if geoscience education is to survive and if environmental education is to profit from that survival.

mental phenomena. By linking the geosciences to human ecology, educators can prepare students for a meaningful role in solving environmental problems (McDonnell & Pickett, 1993; NAE, 1994; Smil, 1993). The intent isn't to supplant traditional disciplines (although some reorganization clearly is needed), but rather to teach students what the role of their discipline is in analyzing complex problems requiring interdisciplinary teams.

Examples of collaboration were reported on three different levels: The first is between geoscience departments at a *single university*, exemplified by the approach to Earth System Science at the University of Oklahoma (contact J.T. Snow, College of Geosciences, Norman, Oklahoma). Collaborations between researchers in different disciplines have also been stimulated by computer modeling laboratories at the Colorado School of Mines (contact D.J. Wilson, Computing Center, Golden, Colorado). On a second level, arrangements now exist between universities and colleges in North Carolina, leading to development of course materials capable of being introduced into *diverse institutional structures* (contact D.J. Crawford-Brown, University of North Carolina at Chapel Hill). Finally, a particularly exciting venture is the Jet Propulsion Laboratory that has entered into *a group project* (project ALERT) with universities and colleges in the California system, making the immense geoscience resources of this scientific organization available in computer form to each of the schools (contact E. Frost, Department of Geosciences, San Diego State University).

[Smil, Vaclav. (1993). *Global ecology: Environmental change and social flexibility.* London: Routledge; McDonnell, Mark and Pickett, Stewart (Eds.) (1993). *Humans as components of ecosystems.* New York: Springer-Verlag; National Academy of Engineering. (1994). *The greening of industrial ecosystems.* Washington, DC: National Academy Press.]

Implications

Social organizational collaborations are the hope of the future if geoscience education is to survive and if environmental education is to profit from that survival. These programs must ensure all students receive a shared base of expertise directed towards the solution of environmental problems and rooted in an understanding of environmental processes and human ecology. The presentations at the AGU conference provide a hint as to how the analytic rigor offered by traditional disciplines may strengthen programs in environmental studies, with necessary concerns for social organization and for interdisciplinary exploration of complex phenomena within computer visualizations.

POLITICAL

Graham T.T. Molitor
President of Public Policy Forecasting Inc.

Holding degree-granting agencies responsible for the competency of their graduates is a logical, if mind-boggling, extension of the accountability movement.

Liability of Degree-Granting Institutions for Substandard Performance of Graduates

After receiving a $1.7 million malpractice settlement against a psychotherapist and the clinic where the therapist worked, the patient-litigant filed suit against the Louisiana Tech University's College of Education, which conferred the therapist's master's degree.

[Editors. (1994, September 14). Woman sues university in malpractice case. *Chronicle of Higher Education*, p. A7.1]

Implications

This is a wake-up call for educators. Holding degree-granting agencies responsible for the competency of their graduates is a logical, if mind-boggling, extension of the accountability movement. Fortunately, tort reform looms high on the public agenda as lawsuits increasingly take on an Alice-In-Wonderland quality. We will keep you informed on the outcome of the suit against LTU.

Reemphasis on Core Curriculum

Students in other advanced post-industrial nations spend as much as twice the number of hours on basic core subjects as do U.S. students. An estimated 40% of classroom instruction in the U.S. is devoted to core subjects such as English, math and science. Critics insist that the U.S. curriculum has been "dumbed down." Hefting the commitment to the core curriculum—4 years of English; 3 years each of social studies, science and math; 2 years of a foreign language; 1/2 year of computer science—was recommended by the highly regarded 1983 report entitled *A Nation at Risk*. In 1982 only 2% of students satisfied this curriculum, and only 17% in 1990.

[Forbes, Malcolm S. Jr. (1994, September 12). Quality time. *Forbes*, 25-26; Kelly, Dennis (1994, June 21). Core curriculum: Toughening up U.S. students. *USA Today*, 1A; Editors (1994, May 16). Education: No time for learning. *Newsweek*, 58.]

A trend likely to continue and be followed by an increasing number of state and local jurisdictions involves linking teacher licensing to satisfactory performance evaluation.

Implications

Education excellence is imperative in this Information Era. Grassroot Americans are demanding greater student achievement from their costly educational institutions. Standards will be established to correctly measure student achievement; educators increasingly will be held responsible for those results.

Teacher Competency Requirements Escalating

A trend likely to continue and be followed by an increasing number of state and local jurisdictions involves linking teacher licensing to satisfactory performance evaluation. Maryland recently enacted such a measure, following the lead of six other states—Alabama, Colorado, Minnesota, Missouri, New Mexico and North Dakota. Maryland's previous licensing merely required payment of a $10 licensing fee every 10 years. Under the new law, teachers will have to recertify every 5 years. Relicensing also will require: satisfactory evaluations for 3 out of each 5 years, in addition to a more widely practiced requirement of extra course work to maintain/upgrade skills, and design of a professional development plan for enhancing competencies. Maryland has also proposed a requirement that new teachers satisfy an additional year of training. Although these new licensing requirements were opposed by the Maryland State Teachers Association, the Maryland licensing provisions become effective January 1, 1995.

[Adams, Lorraine (1994, June 30). Maryland toughens teacher licensing: Recertification to be based on satisfactory performance. *Washington Post*, Al, A18.]

Implications

Teacher licensing is *certification*, without which teachers are barred from teaching in 33 states (including Maryland). Entry requirements and career competency and performance standards are becoming increasingly stricter. Teaching competency is not always easy to measure fairly and effectively. Because development of a human mind may be the most important and certainly the most critical job in the Information Era, each and every input into education will come under increasing scrutiny and fine tuning. The number of states upgrading standards for teaching-licensing is increasing, in answer to the nation's growing concern.

* * *

Professional Development Opportunities

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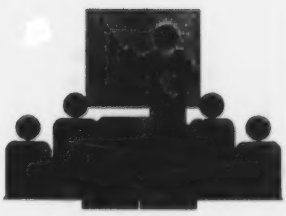

- ***Beyond 2000: Visioning the Future of Community Colleges*, February 26-28, 1995, at the Sheraton World Resort, Orlando, Florida.**
- ***Meeting the Challenges of Global Change: New Tools for New Times*, July 28-31, 1995, at Saint Andrews University, Scotland.**

For more information, please contact our office (919-962-2517).

COMMENTARY

Trudy W. Banta
Vice Chancellor for
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Quality Assessment in Higher Education

Representatives from higher education institutions in 28 countries from around the globe attended the Sixth International Conference on Assessing Quality in Higher Education held in Hong Kong in July 1994. Speakers and delegates collectively provided an informed perspective on factors influencing quality in higher education worldwide and on methods being employed to assess and improve quality.

Increasing size and diversity of the student population, coupled with increasing racial and ethnic diversification, mean that the array of student abilities, educational backgrounds, and learning styles confronting instructors in their classrooms presents ever-greater pedagogical challenges. In some countries there aren't even enough classrooms to accommodate the increasing numbers. In no country are instructors well-prepared to face the tasks associated with coping with diversity. Also, in a global economy, mobility across national and international lines is increasing daily.

The cost of higher education continues to rise at a rate that outstrips virtually every other commodity except health care. But society's needs for other services are also growing, and education dollars are now being diverted to address crime, mental health, and the care of older citizens.

Taxpayers and legislators believe potential workers are spending too many of their most productive years in classrooms rather than jobs. Part of the blame for this delay is institutional inefficiencies that prevent students from scheduling the educational experiences they need when they need them in a sequence designed to produce a degree in four or five years.

In an age of consumerism, academics who have enacted the dual roles of exploring the traditions of the past and conducting the research that will shape the future now must focus on the present, on solving contemporary problems, including how to communicate scholarly work with a very diverse population of students.

Levels of autonomy granted to institutions of higher education are shifting. In the U.S., states are enacting performance funding and a host of other accountability measures; and at the federal level, Ability to Benefit and Student Right To Know requirements appear to be merely the first of the salvos that will diminish institutional autonomy. We know that the National Goals and State Postsecondary Review Entities are waiting in the wings. However, at the very time when governments are exerting more control over higher education in the U.S., central authorities in the UK and Europe are relaxing somewhat their historically firm grip on institutions by granting more autonomy—in exchange for increased reporting on matters of interest to the government. Interestingly, the increase in government requirements in the first instance and the decrease in the second bring all institutions closer than ever in terms of their needs to find indicators of performance that communicate effectively what higher education is trying to accomplish.

At the very time when governments are exerting more control over higher education in the U.S., central authorities in the UK and Europe are relaxing somewhat their historically firm grip on institutions by granting more autonomy.

Conscientiously-implemented evaluation is one of the most powerful strategies available to help institutions maintain and improve quality.

In the Hong Kong conference on assessment, most participants indicated that conscientiously-implemented evaluation is one of the most powerful strategies available to help institutions maintain and improve quality. Proponents of the diverse methods presented at the conference all believe they provide valuable guidance for making decisions about ways to invest increasingly scarce institutional resources in ways that increase efficiency and effectiveness.

Peer review by visiting teams of academics—long used by accrediting agencies and institutions to monitor program quality in the U.S.—is now being developed as a quality assurance mechanism in Finland, the Netherlands, and the UK. Although higher education in Japan has thus far escaped the kind of probing public and governmental scrutiny that institutions in the West have experienced in the last decade, there are many indications that a new era of accountability is beginning there as well, and peer review is being explored as a way of addressing the nascent concerns about quality in Japanese institutions.

Although only a few states in the U.S. have considered performance funding—awarding a portion of public funds for higher education on the basis of performance on specified qualitative indicators—and only Tennessee has a substantial history in implementing it, Sweden, Scotland, and Australia are now experimenting with this approach as a national strategy for enhancing quality. The search for worthy performance indicators is underway worldwide, with Chile being one of the most recent participants in the hunt.

TQM or CQI initiatives are taking place in Australia, China, The Netherlands, South Africa, Taiwan, the UK and the U.S. The TQM quality assessment is a management philosophy that makes continuous improvement the responsibility and goal of every employee and relies upon regular and consistent monitoring of progress. Many U.S. colleges and universities are giving serious consideration to subjecting their quality improvement practices to the intense scrutiny associated with competition for the Malcolm Baldrige Award.

Currently the most interesting and potentially most effective assessment work is being carried out by faculty in hundreds of colleges and universities in the U.S. They are setting new goals for student learning that are clear, explicit, impor-

The expectation for assessment worldwide will become implicit in return for the investments made in higher education.

tant, and measurable. In the process of goal-setting they are conferring with employers, graduates, current students, and faculty in related disciplines to assure focus on the right concepts, sharing these goals with students so that students understand the standards by which their performance will be judged. U.S. faculties are ensuring students opportunities in their coursework to learn what is expected of them, providing multiple learning pathways for diverse students to master the requisite skills and understandings, and assessing student performance throughout the curriculum using written assignments, oral presentations, portfolios, projects, internships, and assessment centers. U.S. faculties are even involving some employers or specialists in the field as assessors of student work. They also look at aggregate performance to detect weaknesses in student mastery that call for new goals, improved teaching techniques, and more powerful assessment strategies, *before* graduation deadlines.

In the future, the expectation for assessment worldwide will become implicit in return for the investments made in higher education—by students, parents, donors, and state and federal governments. Experimentation with an increasingly diverse set of measures will continue as we try to find approaches that will serve both the accountability demands of external publics and the internal needs for information to guide improvement.

Robert A. Scott
President
Ramapo College of New Jersey

We must begin imparting to children in elementary and secondary schools the necessary language skills and understanding of other peoples that our international role demands.

Our increasingly international and multicultural society and the increasingly interdependent relations among nations and groups require college graduates with a global perspective.

The Global College in Process

From Mahwah to Manhattan, from Prague to Dublin, from Ryazan, Seoul, Paris, Vancouver, and Guadalajara back to Mahwah, college and university presidents are discussing the nature of the global university. New York University in Manhattan considers itself a global university. In Ryazan, Russia, the Soros Foundation is sponsoring a project to develop a global school. Regardless of setting, the question is: How can educators enhance education and training through out-of-country experiences?

The imperatives for this new attention to international education come from a variety of sources: academic and business leaders, government and foundation officials. To excerpt a quote from the president of the Hitachi Foundation:

> [The] greatest challenge facing our society in the next century lies in building and sustaining the links between and among individuals, communities, nations, organizations, and disciplines that allow effective community development. [An] education strategy serves as the foundation for building human capacity and creating partnerships, both of which are needed to achieve a sustainable, pluralistic, global society (Roy, p. 18).

The global schools concept relates to the 1992 Carnegie Endowment report:

> We must reorient our university curricula and develop new cadres of professionals — not only for government but for business and finance, science and technology, culture and communications. And we must begin before college, imparting to children in elementary and secondary schools the necessary language skills and understanding of other peoples that our international role demands (Changing Our Ways, 1992, p. 87).

Our increasingly international and multicultural society and the increasingly interdependent relations among nations and groups require college graduates with a global perspective. Contemporary college graduates need global skills as much as they need discrete knowledge for a profession and for citizenship, because upon graduation they either will supervise or be supervised by someone from a different ethnic, national, or racial group.

Ramapo College of New Jersey, aspiring to be a global college, includes in its mission and organization an addition to the aims of conventional missions. Our emphasis is on the nature and structure of joint arrangements between and among institutions and businesses in countries other than our own.

As a global college, Ramapo does not enter into joint efforts with other institutions solely on a bilateral basis, with the supposed global campus as the hub of the wheel, but fosters multilateral arrangements whereby each partner becomes active with others in creating a truly global network of which it is an interactive part. We strive to foster a global perspective that is intensely pervasive and becomes a signature for the institution's activities.

Ramapo's mission statement underscores the commitment to global education and experience; the people and programs of the College fulfill that commitment. Several hundred foreign students, totaling about 5% of the full-time students, from 45 countries, and one-half dozen visiting scholars per year, add to this mixture. In addition, trustees, governors, and advisory committee members as well as full-time faculty add to the global perspective of all activities.

Profiles that exemplify Ramapo as a global college, in which more than 80% of faculty have

The global college prepares for the future by setting institutional priorities to enhance student and faculty opportunities for teaching and learning, and by organizing its curriculum, campus activities, and community outreach with these priorities clearly in mind.

substantial international experience, include:

• A faculty member who as director of the International Business Program specializes in Canada-U.S. trade, has developed ties with Mexican experts in order to enhance the College's programming about NAFTA using teleconferencing for scholarly and student exchanges

• A Fulbright Scholar from the University of Sienna (Italy) who helped our Italian Studies Program exchange visiting scholars and graduate students with Italian universities

• A former Executive-on-Loan from IBM who teaches international marketing combined the business "connection" with his experience in Europe to globalize courses in the International Business Program

• The founding director of the International Telecommunications Center and a major force in creating a telecommunications link with Volgograd Pedagogical State University in Russia who built the infrastructure to support more than 130 teleconferences per year for faculty, friends, and corporate patrons.

Students can earn and learn in paid academic internships in a dozen countries, participate in more than a dozen study-abroad programs and exchanges, and engage in discussions with students, scholars, artists, and officials anywhere in the world as part of our routine classroom teleconferences.

The true test of a global college's success is how well its students and graduates succeed in the international arena. Some of the students who demonstrate this include:

• A psychology major whose global training resulted in a career with a major study abroad organization

• A double major in international studies and philosophy who progressed from a job in the African American Institute to a job in international development at the SOROS Foundation

• An international studies graduate who became program coordinator for the Citizen Exchange Council dealing with former Soviet states

The full list is too lengthy for this article. The message, however, is an obvious one. The global college prepares for the future by setting institutional priorities to enhance student and faculty opportunities for teaching and learning, and by organizing its curriculum, campus activities, and community outreach with these priorities clearly in mind. To accomplish these goals, the global college ensures that all decisions about hiring, program creation and reviews, promotion and tenure, honors and awards, partnerships and budget will support the development of the global mission.

[Roy, Delwin A. (1994, Spring). New partnering for higher education and the corporate sector, *Association of Governing Boards of Universities and Colleges, Occasional Paper, 18* (8); *Changing our ways: America and the new world* (1992). Carnegie Endowment National Commission on American and the New World. Washington, D.C.: The Brookings Institution.]

IN THE 'NET

Perry Brown
Anderson County (TN) Schools

The Jericho Project: Networking Schools and Communities Via TV Cable

Anderson County Schools, a small suburban system 20 miles west of Knoxville, Tennessee, has begun to implement a project to connect local homes and businesses with the 17 Local Area Networks presently serving their 6,700 students. Using the local TV cable wiring and broadband telecommunication technology, the project allows the county to figuratively remove classroom walls so that education occurs not only in public schools, but in homes and businesses, at any time or place. Moreover, it connects the community with the rest of the world, thereby broadening perspectives and engendering the use of information readily available through online resources.

The low cost of joining this network, enables the project to provide a variety of services to all socioeconomic groups, helping to eliminate a polarized society of information haves and have-nots. For example, Jane, a seventh grade student at one of our small, rural middle schools, is from a family with limited resources. She has a report on rainfall in the Southeast due tomorrow. Using her low cost computer and the family's TV cable, she does her homework via the network by using online CD-ROMs to retrieve pertinent data. Using her Internet account, she checks with the 40 other students across the Southeast who have agreed to help her collect data. With the online word processor, she is able to write, spell check and grammar check her report, thus integrating science, math and language arts in completing her report, all done at home after the school is locked for the night.

At this time, Anderson County elementary schools are completely networked so that each child has access to 54 of the latest, most educationally sound, software programs. Teachers and administrators at all K-12 schools have access to servers containing productivity software, including gradebooks, word processing, spread sheets,

Within two years, the project will allow 24-hour, year-round access to this software by students, teachers, administrators and other county citizens.

The ability to join all of the schools in a system with a low cost, highly productive wide area network is crucial to the continued success of education.

data bases, and presentation software. This variety of educational and productivity software promotes the effective integration of instructional technologies in the classroom. Although these services currently exist only at the physical school sites, the project will allow 24-hour, year-round access to this software by students, teachers, administrators and other county citizens within two years.

Because these networks are Internet connected, students and teachers have access to the "information superhighway" without the added expense of modems and long distance phone charges. E-mail is accessible to anyone on the network, thus enhancing teacher-parent, teacher-student and teacher-teacher communication at an exponential rate. Students who need remediation or who wish to accelerate their learning may do so in the evenings and during the traditional "school's out" time. Teachers can direct this learning by allowing students to use only the software that students need. Updating and tracking student usage can be done from remote locations. During the regular school year, homebound students and students who are ill may keep up with their regular work through software access and easy teacher communication.

Anderson County preschools already have a cable connection and only need to purchase computers to have access to the network. The same is true for alternate school settings and Adult Basic Education. Although the K-12 schools have priority of usage, community businesses also have the opportunity to use expensive software packages for only a nominal cable usage fee. Thus the project is a win-win situation for all parties involved.

This model is easily duplicated; any school system could use it. The ability to join all of the schools in a system with a low cost, highly productive wide area network is crucial to the continued success of education. Broadening the use of a school system's resources makes great financial sense, both for the school system and the community. As use of the super information highway of Internet becomes easier, the demand for access will rise accordingly. When students of all ages find that physical location is no longer important to learning, the walls of education will "come tumblin' down," and the Jericho Project will truly be a success!

[Editor's note: Bernard Glassman, who regularly writes this column, found a message by Perry Brown describing the Jericho Project while scanning (he prefers the term "surfing") various listservs on the Internet. He asked Mr. Brown to modify his listserv posting for publication because it serves as a precursor of the technological transformation emerging in education and in community development For more information on the Jericho Project, please contact Mr. Brown at (615) 463-7435 or p_brown@sacam.oren.ortn.edu .]

TOOLS

Bernard Glassman

Word 6.0 is the most deceptively easy-to-use, and fun-to-use word processor I have ever seen.

Microsoft Office

It's here at last—the new and improved Microsoft Office, containing an increasingly integrated package of word processing, presentation, and spreadsheet/charting applications so that you can analyze and prepare presentations to your planning committee with utmost ease.

This review will be in two parts; part one appearing in this issue will focus on Microsoft Word 6.0 for the Macintosh and for Windows. Part two, in the December/January issue, will focus on PowerPoint 4.0 and Excell 5.0.

I've been using Word 6.0 and learning it under Windows for some months now, waiting to review it until I had it running on my Macintosh. Now I can tell you that it is the most deceptively easy-to-use, and fun-to-use word processor I have ever seen.

Easy to use, because you can produce a letter or a memo without going near a manual or a help screen. Move your pointer near any of the tools on the button bar, and a little label pops up to tell you what it does. And the standard tool bar does at least 90% of what you do most to your text.

Deceptive, because deep within the manual and the help screens lies a full programming language—WordBasic. With it, you can do just about anything imaginable to customize, automate, further simplify, constrain, standardize...you name it. Even without WordBasic, it has the easiest macro-building facility I have ever encountered. But most of us write relatively few macros, and only a few of us will use WordBasic, so what's in it for the rest of us?

First, the transition to Word 6.0 from that great wheezing academic workhorse WordPerfect is almost seamless. There is even help and command-equivalents especially for WordPerfect users, so that if you are hopelessly addicted to Alt-Shift-F10 for bold (or whatever) you can have that until you learn to use the little button with the bold B on it. Let me say unequivocally that if you have been using WordPerfect for DOS and are just now making the switch to Windows, go straight to Word. Do not stop and flirt with WordPerfect. Forget about the nagging feeling that everyone else uses WordPerfect. You can save

There are "Wizards," in effect little programs within Word that will walk you through every step of setting up a mail-merge document, or a custom fax cover sheet, or an expense report, or a custom calendar page.

your files in WordPerfect format, or read theirs, as easily as you manage any other files in Word, and far more easily than you manage them in WordPerfect. Period.

Second, it does those pesky tables the way they should be done. If you want to get a quick taste of the greatness of this program (there are thorns on this rose, and I'll get to them in a minute) just click the Table button on the tool bar. It becomes a miniature table, and as you drag across it, it grows until it is as many cells across and down as you want. Release the mouse button and you have inserted your table. A table that is extremely formatable at the same time that it is a simple spreadsheet. You can declare a cell to be the sum of the cells above it, for example. Change the values in one of those cells, and the sum changes. If your work is already in another spreadsheet, you can bring a representation of the spreadsheet into your Word document, and it will update when your original spreadsheet does.

Next, Word sports what its makers call "frames." This is a special category of object that can contain pictures, independently formatted text, a table, anything that might be on a page. What makes a frame so valuable is that it can be independently positioned within the text. Put a graph in a frame, linked, say, to your PowerPoint or Harvard Graphics or Excel program, and then reposition it by pointing, clicking and dragging, just as if you were in a page layout program.

I'm barely scratching the surface here. There are "Wizards," in effect little programs within Word that will walk you through every step of setting up a mail-merge document, or a custom fax cover sheet, or an expense report, or a custom calendar page.

And there is outlining, and table of contents-building, and index generation; and you will find yourself doing them even if you did not do so before.

Now for a couple of thorns. This is a very big program. The full package used 24 megabytes of my hard drive on my Windows machine and my Mac, but that does include dictionary, thesaurus, grammar checker, clip art, everything. And it uses lots of RAM. By default, it will eat 2 megabytes, and it would like a whole lot more. And it is slow on a 486 at 25 megahertz, and slower still on a Mac IIci with 8 megabytes of RAM running System 7 Pro. On the Mac, clicking on the File menu can result in a one-second pause before the menu drops down. There is even a perceptible delay between a keystroke and seeing the text appear on the monitor. Under Windows, it will pick an awkward moment to autosave to disk, such as when you are trying to get down that deathless phrase, and those autosaves take too darn long.

Oddly, it prints like a speed-demon. So if you are one of those very special and wonderful people who write against a deadline, banging out major truths until moments before the meeting you need them for, you have every chance of getting to the meeting on time.

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On the Horizon

The environmental scanning newsletter for leaders in education

December 1994/January 1995 • Volume 3 Number 2

Redesigning American Public Education

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American elementary and secondary schools are seriously deficient in academic achievement. Relative to students in other countries of the developed world, American students score at or near the bottom on standardized tests. As one investigator writes, "the gap between American high school seniors in middle class suburbs and their counterparts in many northern European countries and Japan is *larger* than the two to three grade level equivalent gap between whites and blacks in the U.S." (Bishop, 1991).

In the last issue of *On the Horizon*, Richard Heydinger described a model to reinvent higher education to meet the challenges of the 21st century. In this issue, I will explicate a sociological perspective and concomitant model for redesigning American primary and secondary education to meet these challenges.

New designs call for organizations that are *output-driven.*

Most American schools are administratively driven, three-tiered hierarchical authority systems, with teachers at the bottom, the building principal as the immediate authority, and the district superintendent at the top. This follows standard early 20th century bureaucratic administrative structural design.

Max Weber, one of the first to develop a theory for non-primordial constructed organizations (such as school bureaucracies), describes such organizations as rational authority systems. Over the years, new forms have appeared. In the 30s, General Motors, a multidivisional firm, gave more *autonomy* and *accountability* to divisions of the firm. Another innovative organizational change was *franchising*, setting the rules from on-high, but sharing income. *Spin-offs* were engaged in quite early by 3M of Minneapolis; this process allowed for joint benefits between the employing center and the employee inventor or idea generator. The computer hardware and software industries, as well as genetic engineering firms, have also taken steps to vary and update the bureaucratic hierarchical design.

Most recently, American firms have been experimenting with the Japanese idea of reallocation of *rights*, as described by Aoki (1988) and others. Using pay incentives for high quality and quantity in production, firms allow workers the right to reject parts that are out of specification and to stop the assembly line. Employees are linked in new and creative groups, Quality Circles that are interdependent in effort, goals, and rewards. These groups have collective authority over their members, replacing the authority of line foremen or supervisors. This means that norms develop in these groups that are consistent with and reinforce the organization's goals.

Whereas Weberian bureaucracy was *administratively-driven*, the new designs call for organizations that are *output-driven*. The degree to which the organization as a whole can be said to be

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How can we use these new forms of organization to guide us in producing greater school performance?

Replace administratively-driven schools by output-driven schools.

Use quality circles and backward policing to create a structure that induces informal norms supporting organizational goals.

output-driven depends on the degree to which the external criterion on which the rewards are contingent is transmitted to subparts within. This occurs by explicit design in *backward policing*, a policing of the quality of the product that reverberates backward step by step through the production process of the organization.

How can we use these new forms of organization to guide us in producing greater school performance? Replace administratively-driven schools by output-driven schools. Use quality circles and backward policing to create a structure that induces informal norms supporting organizational goals. Specifically:

1. Impose external standards as the basis for all evaluations of student performance.

2. Base evaluations on two measures: *level of performance* and *performance-gain* or *value-added*.

3. Provide yearly rewards to teachers, students, and parents for level of performance and performance-gain.

4. Use final output criteria (the externally-imposed standards) as the starting point for designing evaluations at each stage in the education of a child, creating a system with short feedback loops.

5. Allocate rights and responsibilities not only to individuals, but also to groups of teachers, students, and parents in order to encourage the development of social capital (i.e., informal norms that support educational goals).

6. Use a core of academic achievement plus an area of specialized performance (which may be academic, but need not be) as the performance criteria.

Given these elements, a number of organizational designs are possible. Three are given below.

Design 1

At the end of each year, students take externally-designed and externally-administered tests. Two grades are given: one is the level of performance on the tests; the other is the value-added, or performance-gain (the difference between test scores at the end of the previous year and test scores at the end of the current year). At the end of high school, students develop a portfolio consisting of scores on each academic subject, plus performance evidence in a specialized field; portfolios are graduates' credentials for employers or for admission to colleges.

Teachers at each of the three school levels (elementary [1-4], middle [5-8], secondary [9-12]) are rewarded each year for the value-added to the children who "graduated" from their responsibility. Teachers at each of the three school levels are rewarded each year with greater autonomy in teaching, including choice of the number of students they will have; the reward is based on the total achievement gain of children for whom the teachers have been responsible for graduating over the past two years. The level of achievement as well as the average achievement gain are published to aid children and parents in choosing among schools.

Children and parents are rewarded for value-added at a given level, with free tuition for postsecondary education, or for postsecondary vocational-technical training. The amount of free tuition depends on the amount of value-added. Which schools children can apply to are determined by their performance level at the end of a 4-year block. Schools (i.e., the teachers) determine the number of students they accept (a decision that affects their potential bonus, which depends upon total—not average—value-added). Teachers cannot choose which students they have. When a school might be oversubscribed, students' priority in admission is determined by their level of achievement on the examination just taken. Teachers in a particular high school must contract with specialist teachers for the specialized area of each student in their care. Specialist teachers would teach, or coach, students from more than one school.

The cohort of students at a given age level in a school is rewarded each year *as a group* for the total value-added for the group for that year. The reward, given each year on the basis of that year's value-added, consists of a certificate usable for purchasing school resources (e.g., computers, audiovisual or other technology aids or field trips) to be "redeemed" by that cohort during its tenure in the school, and then left with the school when the cohort graduates. The decision about how to spend the certificate is made jointly by students, parents, and teachers.

The group of 4 to 16 teachers responsible for a given level of students (four years) is rewarded together for joint performance. There is no school principal. Decisions are made collectively by the group of teachers who constitute the school. There might be more than one school in a building. Schools in the same building could use resources (health, welfare, and other agencies) housed in the same building. Any set of teachers that satisfies state qualification requirements can set up as a school if a certain minimum of students is enrolled.

The school is required to take responsibility for the student during a certain period of each weekday, and the student is required to attend the school. The school may offer to some or all students the option of spending a greater portion

Continued on page 5

From the Editor

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On the Horizon's World Wide Web Site

We are taking our service to a new level with the establishment of a World Wide Web (WWW) site, where you will have easy access to past issues of *On the Horizon*, a futures planning database, as well as to other information to help you work more effectively.

Picture yourself at your computer where you have just launched your World Wide Web (WWW) browser. At the prompt, type <http://sunsite.unc.edu/horizon> to connect to our home page on Sunsite, one of the major Internet computers, where you will see our headline graphic and an index containing the following lines: *Past Issues, Futures Planning Database,* and *Gems from Horizon List.* If you click on the line *Past Issues*, the screen will open to another index, each line of which contains a Volume and Issue Number. Double click on, for example, *Volume 1, Number 1*, for the first page of the first issue we published. You can then scroll through the issue. If you see an article you like, you can transfer (FTP) it to your computer where it can be stored and printed at your convenience.

At any point in your scrolling, you can return to the home page to select another feature. If you select *Futures Planning Database*, you will see a

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On the Horizon focuses on potential developments and critical trends affecting education. It is published in October/November, December/January, February/March, April/May, and June/July by the Institute for Academic and Professional Leadership, School of Education, The University of North Carolina at Chapel Hill. ISSN 1074-8121. Annual cost: individual, $24.50; organizational, $49.50; site license, $124.50. For more information, contact Professor James L. Morrison, Editor, *On the Horizon*, or Assistants to the Editor, K.C. Brown, Robbi Pickeral, Adam Bianchi or Jonathan Barker, CB# 3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599. (919) 962-2517. Internet Morrison@unc.edu.

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screen containing a subject heading index. Select a subject heading and you will go to a screen containing an abstract very much like the one below, including the bibliographical citation and a section about the implications of that abstract for educational leaders. Many of the abstracts that do not get printed in regular issues of *On the Horizon* will be posted in this section. When you want to use or disseminate this information to your colleagues, you can transfer a copy of it to your computer to print and distribute.

Abstract

Title of Article: How we will work in the year 2000

Author/Affiliation: Kiechel III, Walter

Publication: Fortune

Date: May 17, 1993 **Pages:** 38-52

Summary:

By the year 2000, the average size of U.S. companies will have decreased dramatically. Blue-collar workers will be replaced by technicians who can program computers, conduct laboratory tests, or fix copiers. Employees will package themselves as a marketable portfolio of skills. Consequently:

- Businesses will employ fewer people. An average company eliminated 20% of its employees over the last 10 years while tripling its investment in information technology.
- Traditional hierarchies will give way to networked organizations connected to customers and suppliers via electronic channels—virtual corporations.
- Technicians, together with professionals (accountants, scientists, and engineers), will exceed the blue collar work force.
- Vertical division of labor will be replaced by horizontal division—not "Where do you stand on the corporate ladder?" but "What do you know how to do?"
- The standard business paradigm will shift from making a product to providing a service.
- Work will be redefined to involve constant learning, more high-order thinking, and fewer nine-to-five hours. The Internet and related facilities will allow more people to live and work where they want, hooking up electronically to the rest of their organization and working on a project-by-project basis.

Implications:

Educational leaders need to anticipate the implications of advances in computer technology, work time scheduling, and electronic commuting for their organizations. Educational organizations need to increase quality management programs for internal professional staff and faculty development as well as for external programs serving profit and non-profit organizations. Continuing education programs must update employee technical skills for businesses moving to networked virtual organizations using electronic telecommuting.

To contribute an abstract to the database, click on a line titled, *My Contribution to the Database.* There you will see instructions (see box below) and a form to insert bibliographic information, your name, abstract, and statement of implications. We will edit this information and insert it in the futures planning database for others to review and use. We may also post it to *Horizon List* for discussion and commentary, which can then be inserted at the end of your abstract. The richness and utility of the database depends upon contributions from you and our colleagues in various organizational and cultural settings around the world.

To review the last section, *Gems from Horizon List,* return to the Home Page and select that line. Here we have indexed discussion strings by subject title that have been posted to *Horizon List.* These discussions will stimulate your thinking about critical emerging issues, trends, and potential events for formulating strategic plans and policies for your organization. Again, they are available for you to transfer to your computer for printing and distribution to your colleagues.

In addition, this section indexes relevant documents and services for educational leaders to use in planning for the future. To review these documents, click on the title, and you are taken to wherever the document resides on the Internet, be it in Geneva, Berlin, London, Moscow, Tokyo, or Washington DC.

A REQUEST: we need corporate sponsors to help us expand and maintain the WWW site. If you know of an organization that would support this venture, let us know. We would be delighted to acknowledge their support on our Home Page and on our masthead.

Instructions: Abstracting Information for the Futures Planing Database

The purpose of *On the Horizon's* futures planning database is to provide: (a) objective descriptions of the current environment and (b) signals of potential change for educational leaders to take into account when planning for the future.

Criteria for Abstracting

- Does the item represent events, trends, developments, or ideas you have never before encountered?
- Does the item contradict previous assumptions or your own beliefs about what seems to be happening?
- Can you link the item to other abstracts you have previously written or read?
- Do the implications of the item have an explicit or implicit bearing on education?

Writing an Abstract

Summary Section

An abstract is an easy-to-read digest of material in print. The abstract should be written in concise, accurate language fully understandable without reference to the original source. Questions to ask yourself: "What is the primary point or conclusion of the article?" This should be the lead sentence of the abstract. Follow this sentence with the key premises that support this conclusion. Use quotation marks for direct citations from the text. Whenever possible, include statistical data. Limit the summary to no more than one-half page.

Implications

The implications section of the abstract answers the question, "How will the information in this article affect education?" This might include a list of those emerging issues suggested by the article, a description of future events that may occur as a result of the trend identified by the article, and/or an identification of issue stakeholders if they are not listed in the article. Indicate your reasons for selecting the article for inclusion into the database.

Continued from page 2

of each day at school, and the student and parent may choose whether or not to accept such offers. (This provision differs little from the existing extracurricular activities [sports, drama, etc.] that are carried out after school, except that it includes the additional possibility of curricular activities.)

Design 2

Design 2 differs from Design 1 principally in the possibility for some children in the middle and high school to spend part of their school time as assistant teachers in lower schools.

At the middle school and the high school, students with the highest value-added in a given year have the choice of spending half of school time in the next year as an assistant teacher in a lower-level school. Students choosing to spend half time as assistant teachers receive tuition expenses for half a year at a college or in vocational training. In fee-paying schools, such students pay only half tuition for that year. Assistant teachers participate in the bonus received by the school they are teaching in, at a reduced level compared to the regular teachers' bonus.

Design 3

This design is based on an incentive structure that depends on interscholastic competition rather than standardized tests. This design differs from Design 1 in that external tests are replaced by frequent interscholastic competition involving both team and individual performance. Models for these already exist in some areas, such as interscholastic mathematics team competition, debate, and statewide contests involving both academic subjects and the performing arts. All students take core subjects. Students compete on advanced core subjects and in other areas they select. Tournament competitions lead to individual and team ranking. Performance-gains of a student in Design 3 are determined by the differences in the student's rank (combined rank over all subjects contested) between the beginning and end of the year or at the entrance to and exit from a given school. With this modification, all of the Design 1 principles that depend on measurement of value-added or level of performance apply to Design 3.

Conclusion

Not everyone will embrace all, or perhaps any, of these school designs eagerly. In part this is because it is difficult to do more than sketch the bare outlines of the designs. What is more important than gaining acceptance for a particular design, or even a particular aspect of a design, is to convince educators that careful application of well-established sociological principles can be the basis for new designs of schools. It is my hope that this article may serve as a challenge for others to draw upon basic principles in developing competing designs.

We must convince educators that careful application of well-established sociological principles can be the basis for new designs of schools.

(Editor's note: This article is abridged from a paper presented as the author's Sorokin Lecture at the annual meeting of the Eastern Sociological Society, Boston, March 1993, and later published [Coleman, 1993].)

[Aoki, Masahiko. (1988). *Information, incentives and bargaining in the Japanese economy.* Cambridge: Cambridge University Press; Bishop, John. (1991). A strategy for achieving excellence in secondary education: The role of the state government. Paper presented at the Chief State School Officers Summer Institute; Coleman, James (1993). The design of organizations and the right to act. *Sociological Forum*, *8* (4), 527-546.]

SOCIAL

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A New Transformation in the World of Work

Echoing a theme sounded in several publications recently, Peter Drucker (1994) describes a century of profound change in the nature of work. At the start of the century, farmers and domestic servants comprised the largest group of workers. By the 1950s, however, industrial workers had become the largest single group in every developed country. That is history. What Drucker wants to examine is the difference between the eagerness with which workers moved from farm work to industrial jobs, as compared to the difficulty in the current movement from industrial jobs to theoretical and analytical work. The former change, occurring in every developed country, was accomplished voluntarily, and with comparative comfort. The current change, also occurring in every developed country, is meeting with opposition and great personal difficulty. Why the difference?

An obvious answer is that the jobs emerging for the new millennium require new skills. The change from farmer to factory worker required shifting from one set of manual skills to another. Today's new workers will be knowledge workers, who must shift from their manual skills to a set of theoretical and analytical knowledge that can be acquired only through formal schooling. Unfor-

Even the better students in our current system may not meet the standards required of a knowledge-based society.

tunately, most people in developed and developing countries are poorly equipped to compete for these positions. They do not leave the current formal schooling system with the skills to enter knowledge jobs, nor do they have the skills or the values that will allow them to continue to change and adapt. Even the better students in our current system may not meet the standards required of a knowledge-based society.

Drucker defines an educated person in this new society as "somebody who has learned how to learn, and who continues learning, especially by formal education, throughout his or her lifetime" (p. 66). Can we develop such a person through our present educational system?

[Drucker, Peter. (1994). The age of social transformation, *Atlantic Monthly, 247* (5), 53-80.]

Implications

Educators have difficulty providing a thorough grounding in fundamentals. Although elementary and secondary education should begin to stir in its students a desire for and a knowledge of how to learn as well as a willingness to take risks and explore issues, those two ideals are more likely to be addressed in higher education—in training schools and in colleges and universities.

To guide workers into the new era, schools must meet the challenge of these two dimensions.

1. A knowledge of how to learn: the ability to ask questions, the skill of knowing how to find answers and to critically evaluate these answers; and the ability to adapt to what may occur in the future

2. A love of learning for the present and throughout life—a culture and value set that looks to continuous acquisition of knowledge and enjoys the exploration of concepts for the future.

The answer to all our needs comes after we accept certain questions. How do we move from a bureaucratic focus on our current restrictive, routinized system of education to the development of a vision for the future? How do we shift emphasis from memorizing facts to learning how to solve problems? How can we encourage students to take risks and explore issues? How do we develop and reward the processes used in such exploration? There seems to be agreement that change in educational preparation is a basic requirement toward facilitating the shift into the age of knowledge-based jobs. And, indeed, how do educational institutions themselves become learning organizations *a la* Senge?

A love of learning is most critical to the success of individuals in a knowledge society. Students will not become productive lifelong learners merely because we brandish tests they must pass before they can continue. Every educator can point to the student who has become proficient at "psyching out" the instructor, but who has never developed an understanding that places the subject in context, an interest that leads to information being retained, or the desire to answer questions beyond what will be "on the exam." What do we do to instill a passion to continue learning? This passion clearly will be needed for the adaptable knowledge worker of the next century.

We have reached a consensus on the need to assist workers in their movement toward a new work era. Now we need to develop synergy among the individual efforts by schools and school systems so that we will not fail the generations of students yet to come.

TECHNOLOGICAL

Wally Albers
Albers Systems, Inc

The Human Genome Project: Starting to Crank the Handle

There's been an explosion in genetic research in the last decade.

There's been an explosion in genetic research in the last decade. An obsessive search is growing for the genes that underlie the thousands of diseases that have plagued humankind. The Human Genome Project is an organized approach to the mapping of the entire human genome of the DNA in all 23 pairs of chromosomes, in order to figure out the complete sequence of the approximately 3 billion nucleotides linking the dual spiral strands of a DNA molecule. This mind boggling project, which as recently as a decade ago would have been considered a pipe dream, is now considered eminently do-able and is well on its way to completion.

There are many benefits to be realized by society and the part of the population that suffers from genetic disorders. Already identified are the genes that underlie heart disease, colon cancer, cystic fibrosis, a form of muscular dystrophy, Huntington's disease, and one inherited form of breast cancer. We're standing on the threshold of identifying genes responsible for deafness, dyslexia, diabetes, and sexual orientation. The list just goes on and on. A recent edition of *Science* (vol. 265, 30 Sept. 1994) is recommended for the interested reader who would like a more detailed progress report on the Human Genome Project.

Along with the successes of the Human Genome Project come unintended social consequences. All kinds of ethical issues surround questions of autonomy, privacy, justice, and equity. Counseling has become a prerequisite to any decisions to undergo genetic testing. Also, there is a strong movement to limit genetic testing to those tests that are medically therapeutic. How-

There may be an exodus of many educators to the business ranks of start-up companies capitalizing on the new markets spawned by the Human Genome Project.

ever, there is as yet very little agreement on which tests qualify. For example, how should we classify genetic tests for sex selection or trait enhancement?

Another set of issues relates to the developing commercialization of newly discovered medical treatments for the various diseases and traits for which specific genes have been identified. If history is any indicator, then some of the best academic scientists will spin off from faculties to start businesses to provide medical products and molecular engineering consulting that will become part of the growing genetic engineering based market.

Implications

It is such unintended consequences that will have significant implications for education and educators. As more is learned about the gene maps and their connections to various learning disabilities and other barriers to learning, educators should be prepared to alter the process of teaching and counseling in accordance with the new knowledge generated. Educational psychology graduates should be expected to play a greater role in responding to societal needs, while also being a particular beneficiary of the knowledge generated from the Human Genome Project. The entire field of special education will experience this same duality of new roles and new insights. There may be an exodus of many educators to the business ranks of start-up companies capitalizing on the new markets spawned by the Human Genome Project, requiring a spurt of replacement and recruiting in order to keep a balanced, quality faculty in genetics and molecular engineering.

ECONOMIC

Merrial Pritchett
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Reengineering in Higher Education

Customer feedback is driving the need for new ideas in higher education.

The latest management technique to migrate from the corporate world to the world of higher education is *reengineering.* This business redesign process has been cropping up on American college and university campuses from California to New York. Why? What are some of the results? What is reengineering?

In their book, *Reengineering the Corporation: A Manifesto for Business Revolution,* Michael Hammer and James Chanpy, leading gurus of reengineering in business, define reengineering as "starting over," "the fundamental rethinking and radical redesign of...process to achieve dramatic improvements in cost, quality, service, and speed." Four words—fundamental, radical, dramatic, and process—are key to understanding reengineering.

The word *fundamental* asks us why we do what we do. What is the purpose of the process? Example: What is the purpose of the undergraduate admissions process? Examination shows this varies with the specific campus. A campus with selective admissions may use the process to screen applicants. An open admissions institution may use it simply to collect the application fee. Each admissions process should be engineered differently because each serves different ends.

This leads us to Hammer and Chanpy's second key word, *radical.* How drastic must our reinventing be to accomplish our specific purpose? Example: Should we be expending our time and efforts collecting demographic data from students? Wouldn't sampling serve our management needs just as well? Or could we not tap in to the federal government's data, gathered by the Census Bureau? Wouldn't that be cheaper? Radical reengineering is "disregarding...[our currently] existing structures and procedures and inventing complete new ways of accomplishing work."

Dramatic changes include overhauling institutions' core processes, such as teaching, research, and public services. Example: Redesigning instruction from faculty lecturing to physically-present students to students viewing faculty developed multimedia presentations over the information superhighway.

Process, the most important key word, and the one most difficult to deal with, requires a broadening of focus, from singling out the job, person, or organizational structure, to total inclusivity. A holistic view, in the business-like terminology of reengineering, adds to the technological reinvention of the product and the customer, words educators eschew on traditional, moral, political, or perhaps even snobbish grounds. On practical grounds, however, if education is going to accept adaptations of business processes, then education is a product bought by and delivered to customers (students, and by bill paying extension, their parents and/or the government).

Customer feedback is driving the need for new ideas in higher education. There are innumerable schools of thought among educators on how to solve higher education's problems. Some believe that reorganization does not demand starting over in toto. Most educators seem to agree on at least

While reengineering may not be *the* answer to higher education's problem, it certainly is a step in the right direction.

one change—a move toward making information data-intensive. Many nay-sayers to reengineering advocate less radical approaches, with perhaps the application of information technology alone. Total Quality Management (TQM) suggests relying on incremental changes. In a devastating critique, James Porter (1993) finds reengineering in higher education an impossibility; he believes that reengineering "should be brought in [only because] a need exists for heavy blasting." Selective processes, however, do not solve higher education's current problems, according to Dibble and Glenn (1994); they do not accept the single answer solution.

Examples of variations of reactions to reengineering and proposals for solutions to higher education's problems abound. The National Association of College and University Business Officers (NACUBO, 1994) cites six excellent case studies on reengineering: procurement, managing facilities, admitting undergraduate students, creating master course schedules, updating employee personnel records, and disbursing financial aid awards. Also recommended for further examination is a paper by Heterick (1994); CAUSE's library of articles and documents on Business Process Reengineering (BPR), accessible through listserv or gopher (info@cause.colorado.edu); Dibble and Glenn's seminar (1994) with its two very powerful simulations on admissions and transfer credit evaluations; and a series of articles written by Carol Twigg that have been appearing in recent issues of *EDUCOM Review*.

Reengineering is more than a fad or the management technique of the month. Educational organizations are now competing for financing and legislative attention with prisons and welfare agencies. For cutting costs, and meeting the accountability requirement, an adapted business process of reengineering holds real promise. Although the taint of commercialism may offend some educators, that may be the aspect that entices and satisfies legislative and other customers, who are demanding cutting costs, cutting out waste, freeing up existing resources, enhancing and introducing new academic programs, in order to improve the product.

Reengineering is complex. It is neither cheap nor quick. It may save no money and still be worthy because it results in better service, quality, speed, and customer satisfaction. While reengineering may not be *the* answer to higher education's problem, it certainly is a step in the right direction.

[Dibble, Tom; Glenn, Robert. (1994, June 11). Fundamentals of process reengineering in higher education. Seminar presented at American Association for Higher Education Ninth Annual Conference on Assessment and Quality, Washington DC; Hammer, Michael; Chanpy, James. (1993). *Reengineering the corporation: A manifesto for business revolution.* New York: Harper Business; Porter, James. (1993). *Business reengineering in higher education: Promise and reality.* CAUSE Professional Paper #9. Boulder, Colorado; Heterick, Robert (Ed.). (1994). *Reengineering teaching and learning in higher education: Sheltered groves, Camelot, windmills and malls.* Cause: Boulder, Colorado; NACUBO, Business process redesign for Higher Education (Washington, D.C.) 1994; Twigg, Carolyn. (1992, July/August). Improving productivity in higher education: The need for a paradigm shift. EDUCOM Review, *29* (4), 22-26; Twigg, Carolyn. (1994, September/October). The need for a national learning infrastructure. EDUCOM Review, *29* (5), 16-22.]

ENVIRONMENT

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How Do We Know If Environmental Policies Are Working?

Augustine of Hippo cautioned that Heaven is filled with good intentions and desires. Throughout the environmental field there is enough noble sentiment to carry policy decisions well into the future. What is lacking is any systematic evaluation to determine the efficacy of the policies. Can we agree on a definition of environmental quality? Do our policies achieve our goals?

Students of environmental science and environmental studies must agree first upon a definition of environmental quality. Second, they must be trained in assessing the quality of the environment and in measuring the effectiveness of environmental policies at improving this quality. Understanding the processes that control the environment must be complemented by active exploration of changes in the environment and their causes. To the degree these causes lie in environmental policy decisions, it is essential that the steps leading from the decision to environmental change be mapped out in detail. In most areas of public policy (e.g., education and health), measures of the outcome have been developed and used to assess the effectiveness of those policies. Similar developments in environmental policy have been weaker, due in part to disagreement about what *quality* means in this context and to the scientific complexity of environmental discus-

A link in the path from environmental assessment to policy assessment is missing.

Students must question the results of environmental policies and develop practical, reliable, appropriate tools.

sions. Books such as Portney's (1990) *Public Policies for Environmental Protection* have begun to explore this vital area of policy effectiveness, if only in sketch.

Scientists must direct attention not only to analyzing specific phenomena (such as the transport and transformation of pollutants), but to developing tools needed to relate environmental quality and environmental policy. As a first step, measures of environmental quality must be developed and used. The National Acid Precipitation Assessment Program (NAPAP), one example of such an effort, provides insights into the methods for defining and quantifying environmental quality. (A description of the program may be found in *The Experience and Legacy of NAPAP* available through the National Technical Information Service, Springfield, VA, 22161.)

Even in NAPAP, however, a link in the path from environmental assessment to policy assessment is missing. Although the program provides information needed to judge environmental quality, it is less clear that it can locate the causes of environmental change in specific policy decisions. This weakness is more pronounced in the new United States Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) intended to characterize the entire environment (not just with respect to acidification). Massive amounts of data are being made available through monitoring programs, many based on NASA satellite images assessable through the World Wide Web.

[Note: for more information or available data and images, and their locations on the WWW, contact Donald Johnson or Martin Ruzek, Earth System Science Education Program, Universities Space Research Association, Washington, DC, 20024.]

[References: Portney, P. (1990). *Public policies for environmental protection.* Resources for the Future: Washington, DC.]

Implications

More interaction is needed between environmental scientists and policy analysts. Scientists must educate policy analysts in how the environment may be characterized and how specific human actions affect that environment. Policy analysts must educate environmental scientists as to the most valued measures of environmental quality and the many forms in which environmental policy decisions have structured human interactions with the environment.

Students in both environmental science and environmental studies should at some point in their education trace an environmental policy from inception, through implementation, to assessment. They should be asked to:

1. Assess the quality of the environment before the policy was put into place.
2. Determine the changes in human actions dictated by that policy.
3. Assess whether or not those changes took place and to what degree.
4. Assess the quality of the environment after those changes.
5. Judge whether or not the policy has been effective.

The possibilities for case studies are numerous and include a focus on land use policy, recycling and emission of air toxins as quantified in the Air Toxins Inventories available through the EPA or state departments. The actual example used is less important than students questioning the results of environmental policies and developing practical, reliable, and appropriate tools.

POLITICAL

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US Midterm Elections: A Watershed or Something Else?

The Democrats took a beating in the November voting, the worst in a midterm election during a first term presidency since 1922. This was also the first time since 1860 that a Speaker of the House failed to gain reelection. Now that Republicans will control both houses of Congress for the first time in 40 years, as well as occupy three-fifths of the governorships, there is considerable talk of President Clinton's eviction from the White House after the 1996 elections. Those pundits may be correct, given that the last two Democratic presidents (Johnson and Carter) were forced to readjust their policies in the face of less devastating midterm losses than occurred this time, but in so doing alienated the activist Left within the party and failed to retain power (Broder, 1994). Some observers go further than simply suggesting a Republican return to the White House (which they held for 20 years between 1969 and 1993), warning that the Democrats are in danger of playing the role that they did in the late 1800s as the "Everyone Else Party," a ragtag union of those with little in common except not being Republican, able to win some presidential elections but not able to govern (Von Hoffman, 1994).

Predictions such as these are based not only on

Voters were won over by the philosophical positions held by the Republicans—less welfare, less taxes, and less government.

Disenchantment of voters with those in power may result, not in their seesawing between the Democrats and Republicans, but in their turning in larger numbers to third party candidates.

the election returns, but on the voting trends. For example, although higher proportions of men than women have been voting Republican, the gap was the largest in the last eight Congressional elections, with 54% of men and 46% of women voting Republican. Also, although Democrats voted overwhelmingly for Democrats and Republicans for Republicans, those in the middle (a growing proportion) went heavily (56%) for the Republicans, the highest since 1980. The white vote, usually a relatively even split in Congressional elections, went 58-42 for the Republicans, whereas African Americans and Hispanics maintained their traditional patterns, supporting the Republicans with 12% and 30%, respectively, of their votes (Connelly, 1994). Even so, the African American vote can no longer be taken for granted by the Democrats, as California's Pete Wilson and Michigan's John Engler each garnered 16% of the black vote in their successful gubernatorial reelection campaigns, and as the relatively unknown Bernadette Castro received 20% of the black vote in her unsuccessful attempt to unseat New York's Senator Daniel Patrick Moynihan (Broder, 1994).

It is instructive to examine post-election polling that indicated that voters were won over by the philosophical positions held by the Republicans—less welfare, less taxes, and less government. *The Washington Post*, in a survey completed four days after the election, was told by half of those interviewed that it was a "good thing" that the Republicans would control Congress; only one in five said that Republican control would be bad. An NBC/*Wall Street Journal* survey indicated that 55% of those polled wanted Congress, not President Clinton, taking the policy lead; only one-third feared that the Republicans would "go too far" from what voters want. It was clear from all of the exit- and post-election polling that voters wanted change, and that they saw the Republicans as better able to provide it (Morin, 1994).

If the projected Republican domination is to last beyond the near term, it would require the consolidation of this year's electoral victories into a long-term ruling coalition through the swift enactment of changes that restore the confidence of the voters in their government. According to conservative analyst, Kevin Phillips (1994), however, a golden age of Republicanism is not a foregone conclusion.

[Broder, D. (1994, November 13). President and his party confront a task of historical proportions, *Washington Post*, pp. A1, A8-9; Connelly, M. (1994, November 13). Portrait of the electorate: Who voted for whom in the house, *New York Times*, p. A24; Morin, R. (1994, November 13). Voters repeat their simple message about government: Less is better, *Washington Post*, p. A1,6; Phillips, Kevin. (1994, November 13). Volatile voters imperil Republicans, *Washington Post*, pp. C1-2; Von Hoffman, N. (1994, November 13). People's party loses grip on masses, *Washington Post*, pp. C1-2.]

Implications

The domination of American politics by Republicans, swept into power on a philosophy of government that calls for less regulation, smaller bureaucracy, fewer programs, and reduced spending, along with conservative moral positions, may have profound impact on education. Some foreseeable examples are: reduced federal spending taking form through the abandonment of government subsidized higher education/business partnerships in the area of applied technology, cutbacks in the Head Start Program (a bigger target given the recent publication of *The Bell Curve*), and reduction or elimination of the interest subsidy in federal student loans. The reduced flow of federal funds to schools and colleges may be accompanied by fewer strings, providing some compensation in the form of reduced compliance costs. Regulatory reduction may also be accomplished through a less activist affirmative action and civil rights enforcement effort. We are also likely to see action in education on matters of symbolic importance to Republicans. One of the first items that Newt Gingrich, the new Speaker of the House, pledges to advance in fulfillment of the Republican "Contract with America" is the return of school prayer.

The promised overhaul of welfare (including the distribution of federal funds to the states in the form of block grants), as well as reductions in programs such as public support of food banks, will affect urban schools. With North Carolina's Jesse Helms as chair of the Senate Foreign Relations Committee, we may see reduced levels of foreign aid (except to countries with obvious strategic importance to the US), perhaps retarding educational development initiatives in affected nations.

A final implication: The disenchantment of voters with those in power may result, not in their seesawing between the Democrats and Republicans, but in their turning in larger numbers to third party candidates. The complexity of America's problems are now compounded by the surge toward globalization, making it even more difficult to predict the establishment of a political center and stability.

COMMENTARY

Don Barker
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Lewis Perelman views technology as a vast tidal wave that will smash down the existing educational system, completely and utterly obliterating it.

Parker Rossman argues that rather than disappearing, colleges will band together to form "global electronic universities," offering courses and complete degrees to students throughout the world.

Two Futures

Telecommunications, multimedia, electronic publishing, intelligent software, video-conferencing, voice recognition, and virtual reality will eventually make the bulk of human knowledge easily accessible to anyone, anytime, and anywhere. The exact shape these turbulent forces will carve out of the existing educational landscape is far less obvious.

Two observers of the changing education scenario for the 21st century are Lewis J. Perelman (1992) and Parker Rossman (1992). Perelman maintains that current educational organizations are not effective and will not evolve into an appropriate learning system for the 21st Century. He views technology as a vast tidal wave that will smash down the existing educational system, completely and utterly obliterating it. In the wake of this mass destruction, Perelman anticipates the rise of a more cost-effective, focused, skill-oriented, and electronic-based learning environment, an environment where certification tests replace credentials (i.e., degrees) an environment where autonomous learning supersedes classroom lectures.

Rossman, on the other hand, envisions a much more benevolent future for education. Rossman believes that traditional degree programs will not only survive but will thrive in the age of digital communications and information. He argues that rather than disappearing, colleges will band together to form "global electronic universities," offering courses and complete degrees to students throughout the world.

Why do the same basic technological trends produce such divergent pictures of education's future? The answer may lie in the difference between the medium and the message. Perelman unquestionably views technology as a revolutionary force destined to transform not only the way we teach (the medium) but also the very substance of what we teach (the message).

Rossman has a more restricted view of the impact of new technologies on education. He sees technology as a more evolutionary than revolutionary force. Both authors believe that the educational delivery system (the medium) will be radically altered. Both authors agree that advances in technology such as virtual classrooms and virtual libraries will soon enhance all learning.

Perelman and Rossman disagree on the message (i.e., traditional subjects and degree programs). Perelman's dire predictions of the end of traditional education stem from his belief that the emerging worldwide knowledge-based economy will demand professionals with specific skills that are best acquired by an "on the job" approach. Rossman, on the other hand, foresees the information age as an opportunity for traditional schools to evolve. Schools that choose not to embrace the changes may disappear, but those that actively embrace the advances will no doubt flourish. The incredible growth in K-12 and college sponsored hi-tech distance education programs attests to an evolution of the medium. In addition, the growing emphasis on applied skills and internships signify the attempt to "tune" the message to the changing market place.

New players will present themselves in the educational arena (e.g., a Virtual On-line University); many schools will evolve and nimbly adapt to the new environment. Teachers will also evolve from lecturers (or "dispensers of knowledge") to guides, facilitators, advisors, and fellow learners and travelers within the endless expanses of cyberspace. There will be casualties, but there will be tremendous success stories too.

Tomorrow's learner may well attend class electronically and expect a more applied agenda. Chances are good that a majority of today's schools will be there to provide the guidance and help necessary to master this brave new virtual world.

[Pereleman, Lewis. (1992). *School's out: A radical new formula for the revitalization of America's educational system*. New York: Avon Books; Rossman, Parker. (1992). *The emerging worldwide Eeectronic university: Information age global higher education*. Westport, Connecticut: Greenwood Press.]

Ian Jukes
The FutureView Group

Making Technology Work

As a roving educational technologist, I've glimpsed the good, the bad, and the ugly of educational technology. What never ceases to amaze me is how powerfully and positively children respond in technologically-enriched learning environments. However, I must admit that it's with a dual sense of marvel and dismay that I see them eagerly embrace, integrate and apply complex technologies.

Just as I transfer my thoughts to paper, only occasionally considering my arm, hand, or the pen itself, these young folk create with electrons—

There is one thing worse than not being able to see; being able to see and having no vision.

Helen Keller

effortlessly weaving words, images, video, sound, and telecommunications technology together into breathtakingly creative and interactive multimedia presentations, only rarely considering the keyboard, mouse, computer, or program itself. Technology has become as natural a part of this generation's life as breathing.

Unfortunately, however, the technology revolution seems to have passed by many of those in our educational communities. The educational roadway is littered with conceptual potholes and the mangled psyches of white knuckle technophobic educators who seem functionally incapable of properly resetting the stations on their car radios; programming a VCR so that it stops flashing "12:00 AM;" properly using ATM cards; or correctly operating a microwave, cellular telephone, fax, or digital coffee maker. How, then, will they ever be able to differentiate between a mouse, hard drive, RAM, ROM, or multimedia computer, or discern how any of these items might possibly fit into a classroom, office, or home?

Our future depends on how quickly and effectively we move to make schools and communities more relevant to the world of tomorrow.

What can we do?

What follows are a number of practical no-cost/low-cost ideas for developing or implementing a community plan for the integrated use of technology within a broader community restructuring plan.

Taking a *we* rather than a *me* approach to change, work together to develop a shared vision that starts with the building of a broad-based community ownership that is composed, not imposed. Success stems from including all stakeholders who might be affected, giving them ample opportunity to be actively involved in the creation of the vision. A broad-based initiative must include teachers and administrators, students, parents, small and large businesses, senior citizens—anyone and everyone who could and will be affected.

Begin by developing an integrated curriculum that includes a clearly defined multi-grade, cross-curricular scope and sequence that focuses on active, cooperative, interdisciplinary, and individualized learning. Esablish a clear connection between what students learn and why they will learn it. Disciplines that develop subject outcomes in isolation unrealistically expect other stakeholders to be willing to graft these outcomes to suit their various needs. Instead, the process must be designed as a cooperative and comprehensive undertaking that satisfies the goals of everyone in the community—not just the educators and administrators.

Start by creating a broad-based plan that clearly identifies what students should be able to do using various technologies and then link these outcomes to identified skills, knowledges, attributes and behaviors.

Technology is not a one-time cost

Twenty-first Century infrastructures must embrace computers, data communications, and other media yet to be developed. This will require an educated population that can navigate the current and emergent informational infrastructures in the same way that workers could navigate the transportation infrastructures of the Industrial Age.

When asked what it was like to be blind, the great American writer, teacher, and human being, Helen Keller, responded that there was one thing worse than not being able to see, and that was being able to see and having no vision. Vision is still the keyword for the future. Your job, my job; your pension, my pension; our future depends on how quickly and effectively we move to make schools and communities more relevant to the world of tomorrow.

Theodore Leverenz
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The Student As Investor

Higher education has accepted change as necessary for survival in the next century. As traditional perceptions of higher education have had to change, so too must traditional perceptions of students change.

For example, the medical model views students as coming to higher education with academic weaknesses that must be treated. After making a thoughtful diagnosis, institutions prescribe a schedule of treatment (i.e., coursework) to remediate the scholastic illness. The medical model, however, is based on a negative (if not dubious) premise that most, if not all, students arrive with something wrong with them, a perspective that is inherently skeptical of students' likely success.

Those holding to a gas station model view students as one-stop purchasers of education. Students drive in, passively fill up with knowledge, and drive away. But this model holds that students will eventually "run out of gas"—that the long-term value of their educational experiences is severely limited.

The product model takes a manufacturing perspective. Students, the raw materials, are taken in, put through a process that molds them as the institution believes is appropriate, and supplies them to business and industry through the marketing efforts of campus career placement centers. This model allows only limited attention to the feelings, goals, aspirations, and ambitions of students.

As traditional perceptions of higher education have had to change, so too must traditional perceptions of students change.

Successful students, like the investors they are, develop a clear sense of purpose behind their learning decisions—and accept responsibility for those choices.

In the customer or retail model, colleges and universities, like auto dealerships, offer a variety of models (degree programs) with standard features. As with automobile sales, each program is enhanced with options (electives) ranging from international exchange opportunities to field work to extra-curricular activities. The difficulties with the product model, similar to the gas station model, are that it is more competitive than cooperative, focuses on convincing the customer to buy from what is available, even if it isn't what the customer really needs or wants, and puts a priority on the quick sale rather than return business (i.e., matriculation rather than graduation). Very little attention is given to after-sale service or follow-up.

These models share two additional disadvantages. By definition, students are essentially passive elements—compliant, submissive, acquiescent. And students must go to where the education takes place.

In the future, truly successful institutions will reconfigure themselves based on a view of students as investors. Investors make commitments for specific periods of time and do so with goals other than simply making money. The purpose of making an investment is to acquire sufficient resources to spend on other things, which in fact are the real goals (e.g., a house, vacation, retirement). Investors are willing to do without the use of their money for those investment periods. The level of trust between investor and broker is directly related to the long-term value of investment activities.

Investing has a developmental quality. As the relationship between broker and investor grows, each more fully appreciates the value and appropriateness of the advice being offered. And each acquires a clearer picture of what is involved in making the investment work. Investors soon begin to develop the ability to recognize opportunities on their own, to clarify their own investment goals, to exercise better judgment, to make more informed investment decisions, and to take responsibility for their investment choices. Brokers likewise gain insight into investors' motivations, their abilities to invest, their interests, and their ultimate goals.

Like investors, students make commitments for specific periods of time. Students do without, they pay tuition rather than take vacations, and they pass up job opportunities. Successful students, like the investors they are, develop a clear sense of purpose behind their learning decisions—and accept responsibility for those choices.

In higher education, there ideally exists a mutually committed relationship between teacher and student that is based on trust (i.e., that students will work to learn; that teachers will offer something worth learning). Learning is a cooperative effort that is enhanced, improved, and made more productive the longer the student/teacher relationship continues, not unlike investor/broker relationships.

Just as the wise investor continues to invest, the wise student continues to learn. And yet neither is likely to continue the activity in absence of a return, especially if losses outweigh gains. Lifelong learners acquire an ability to assess their educational needs and potential educational opportunities in much the same way that seasoned investors develop a sense of how to evaluate their investment needs and opportunities. Thus, the quality of the educational experience can be judged largely, if not exclusively, on the return to the student.

In truth, higher education probably will need to include elements of each perspective; it's fair to say that no single model will be as effective as using the best aspects of all of them. Yet, the investment model is a more cooperative and positive model, most likely to yield the greatest benefits.

Professional Development Opportunities

- ***Beyond 2000: Visioning the Future of Community Colleges*, February 26-28, 1995, at the Sheraton World Resort, Orlando, Florida.**

- ***Meeting the Challenges of Global Change: Planning for the Future of Education*, at Saint Andrews University, Scotland, July 28-31, 1995.**

For more information, please contact the *On the Horizon* office (919-962-2517).

IN THE 'NET

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Bumps on the Road to the Global Village: Lessons from the Jericho Project

The dream of a Global Village, where everyone is connected electronically to information, software, and to each other, is becoming more viable every day. In the last issue of *On the Horizon,* I described one such village—the Jericho Project in the Anderson County (TN) Public Schools where the community and the schools are wired in a Wide Area Network (WAN) via local cable TV and broadband cards. From our experience in designing and implementing this project, we encountered a number of problems that will likely impede the construction of a true Global Village.

In addressing the funding issue, it became obvious that adequate funding hinged on profitability for the cable company and for software producers.

When we first began our project, we only envisioned two major problems: (a) finding the technology to allow us to transmit over TV cables, and (b) finding a means of funding a project connecting 18,000 homes and businesses in the community so that they could use the software on servers in the public schools. The first issue was much easier to solve than we expected. Using high speed data transmission and high capacity storage facilities for information and programs is becoming almost a ho-hum affair with the advent of ATM technology used in banking. Even telephone circuits are increasing to speeds adequate to handle multi-user traffic, and TV cable is capable of handling traffic at speeds up to four times faster than phone lines. With the impending passage of the new data communications bill in the next Congress, the possibilities are exponential, as phone carriers begin competing with cable companies.

The second issue was solved by a $100,000 grant from the Tennessee Department of Education that enabled us to fund our project; moreover, we received a limited amount of fiber optic cable from the TV cable company.

In addressing the funding issue, it became obvious that adequate funding hinged on profitability for the cable company and for software producers. This problem was connected to the issue of the legality of many users accessing the same software over a Wide Area Network.

Software publishers that provided the best software, the best advertising, and the best training would prosper with the "pay-per-view" strategy.

Although the Software Publishers Association, IBM, WordPerfect, Lotus, and several other software houses have declared that today's software licensing agreements do not include WAN usage, most WAN developers, including at least one government agency, choose to simply ignore the problem by allowing unmonitored access to commercial software through dial-up modems.

This should not be a problem. For example, if a small community purchased a fifty-user network license of WordPerfect and allowed all potential users in the community access to it, chances are that not more than fifty people would need access to the WAN at the same time; if they did, more licenses could be purchased. But this practice would eliminate large numbers of people from WordPerfect's customer sales base; no one would purchase software individually. If this happens in every community around the world, there could be four possible outcomes:

1. Software companies might cease to exist.
2. The price of software might rise beyond the ability of individual end-users to purchase it.
3. National governments might intervene, since WANs transform private use to a public good (like public roads and parks).
4. A new marketing strategy would need to be developed by software companies.

However, a "win-win" approach that will benefit both the community and software and cable businesses is a "pay-per-view" strategy. With this strategy, the "latest, greatest" products would be supplied by software houses to WAN providers, who would manage the software and bill each customer for use, passing revenues back to the software houses. End-users would benefit from this because they would have access to many, previously too expensive, software packages, at competitive hourly usage fees.

In the Jericho Project, we intend that vendors provide training for their products via the local TV cable company. Because vendors would vie for customer usage, they would have to provide outstanding training at no direct cost to the consumer. With each new update of a product, end-users would have instant access and training at no additional cost.

Software publishers that provided the best software, the best advertising, and the best training would prosper with the "pay-per-view" strategy. Even though the hourly end-user cost would be very low, the base of people using the product would be much larger, thus creating profitability. More specialty software would be developed due to the increased user base. Software publishers would have to be customer responsive to survive in this truly capitalistic system.

A key factor in this solution is profit for WAN providers (phone and cable companies) and software publishers: The WAN provider receives a percentage for management and collection for software usage, thereby being more willing to invest in connecting houses, businesses, and the schools; software publishers receive income depending upon the amount of usage of their product in the community; parents, students, and citizens receive low-cost access to the latest software based upon their needs.

Though this solution would be a win-win one for all involved, the idea is far from becoming

reality. Software publishers and WAN providers agree that a system wide change in marketing must occur, but most are afraid to make a change without unanimous acceptance. To date, only IBM EduQuest (the educational arm of IBM) has been willing to actively explore the concept.

Until others join the struggle, the road to the global village will continue to be unpaved.

[Editor's note: If you have any suggestions or comments concerning this issue, please contact Perry Brown, Director of Technology, Anderson Co. (TN) Schools at (615) 463-7435 or p_brown@sacam.oren.ortn.edu.]

TOOLS

Bernard Glassman
Pragmatix:Information Design

Microsoft Office: The Rest of the Story

For those who just need a great word processor and not an entire programming environment, it is a heck of a good investment. If you can find Word 5.1 at a reduced price, go for it.

Excel continues to develop into an astonishingly versatile tool for a desktop analyst/ planner, or a number-crunching senior executive.

In the October/November '94 issue, I reviewed Microsoft Word, the word-processor component of Microsoft Office, a suite of computer programs that run under Windows 3.1 and on the Macintosh. I had been happy with the Windows version; when the Mac version was released, I gave it a quick test and published the review. My only complaint was that Word ran a bit slow on my Mac IIci. I can now quantify that. Creating a mail-merge document takes ten times longer for each step on the Macintosh than it does on a 486 under Windows. The performance is so poor that there is simply no justification for Macintosh users moving up from Word 5.1.

The highly touted platform-independence of today's programming languages is resulting in code-heavy, feature-overloaded applications that do fine in the environment that Microsoft knows best—Windows and DOS, but are completely dysfunctional on the Macintoshes still in use by owners of most Macs. Is it possible that Word actually performs acceptably on a PowerMac? Perhaps. Is it warning-labeled for the non-PowerMac user? Nope.

The previous version of Word has most of the capabilities of Word 6.0; it is faster by an order of magnitude; and for those who just need a great word processor and not an entire programming environment, it is a heck of a good investment. If you can find Word 5.1 at a reduced price, go for it.

The remainder of Office includes PowerPoint, a presentation creator; Excel, a spreadsheet; and Access, Microsoft's own database.

PowerPoint's great strength lies in its templates and Wizards. Templates are predesigned layouts into which you need only place the words and art of your choice. Wizards are semi-smart programs that assist you interactively in making design decisions. Both are useful because they save time and help you improve your slide show in ways you might not have envisioned.

Few of us give slide shows without graphs and tables; PowerPoint is fine at assisting in the preparation of each. There is considerable breadth, if not depth, in the range of each. For even greater versatility, you can embed a slide with a graph or table from an Excel spreadsheet. This means you can bring to a PowerPoint presentation the ability to update figures rapidly, with all the complex equations you need. Thus, although PowerPoint is not able, on its own, to calculate standard deviations or perform regressions and cross-tabs, an embedded table from Excel can.

If you change your mind at the last minute, and decide to do overheads rather than slides, PowerPoint can assist you with reformatting to the different aspect ratio. PowerPoint includes a variety of transitional effects for use with an LCD device for overheads, or a video projector, or presentations made directly on a monitor, and even helps you program them in. You can also incorporate animation and video, but these functions are more complicated; they may be a job for someone in your AV services department.

As for speed, the differences between the Mac and Windows is in no way as bad as in Word. The same goes for Excel, discussed below.

Excel continues to develop into an astonishingly versatile tool for a desktop analyst/planner, or a number-crunching senior executive. By opening several spreadsheets, making each of them a database, and linking them all with macros, the result of a query in one could be factored into a query in another. In addition to the increasing friendliness of the interface, there is an amazing number and breadth of functions that can now be performed in this remarkable program. It even has the ability to link into the very databases that you are currently manipulating with SAS. (If you have wrestled with the hugeness of SAS for Windows in order to do simple regressions or chi-squares, stop wasting the disk space and RAM.) Just the fact that field names don't have the SAS eight-character limit is a blessing in itself. But more useful is the "tablecloth" effect of working in Excel. You can: enter a set of figures over here; perform various functions on them over there; open a separate view of the results in a window all its own; create a graphic representation linked to those results in yet another area; and jot down some notes about a particular table, complete with circles and arrows.

Some of the Excel features I use most:

1. *Auto Fill*: Enter January into one cell, Febru-

The latest Microsoft Office is a suite of excellent products for Windows, available as a group for way less than the sum of the parts. A bargain. On the Mac—an utter waste of money.

ary into the next cell, select both, then drag the little handle in the corner across a range of cells. Watch March, April, etc., fill in automatically. Enter 1994, then 1995, and drag the handle, and you get 1996.

2. *Auto Format*: Select a range of cells, use the Auto Format command, and select a style; you can choose row and column labels set in bold italics, add a line above totals, alternate colors, values, etc., from the sober to the ridiculous.

3. *Format Painter*: You work hard to put your table into a particular format, then you create another table. You want it to have the same format. Choose the paintbrush from the toolbar, click on the table you want to mimic; apply the same format to your new table just by "brushing" it with your mouse.

4. *Help*: For Excel's Help you'll use a few megs of hard drive, but it's fast. In 5.0, it's sensitive to the problem you are confronting at the moment, known among jargonizers as being "context-sensitive."

5. *In-cell editing*: When you click on a cell to change a number, you can actually see your cursor in the cell, select a range of characters, delete, backspace, use arrow keys, all without having to look up at the formula-entry area.

6. *Column Auto Fit*: A column full of numbers can be a few hundred rows deep. Click at the top of a column to select the column, use the Auto Fit option, and you can be certain that the column is now as wide as its widest entry. Unfortunately the column does not automatically adjust in width as you add longer numbers or names to subsequent cells.

There are a lot more features, but suffice it to say that everything is a little bit easier to use in Excel 5.0.

Access is an extremely powerful database in the Windows version of Office. Access has a form of on-screen help that Microsoft calls "cue-cards." They appear as slender sets of instructions that keep track of what you are doing and ask you what you want to do next. It says, "OK, what do you want to do now? Create a form that presents the data for a record in a particular database? Design a report to show all the records that are the result of a query?" You click buttons on the cue-card and it takes you to the next set of instructions, which you can carry out while the cue-cards watch. Regretfully, only Access has this feature; it would be great if all programs had cue-cards. An audio version would also be a welcome addition to the next edition of Microsoft Office.

I will leave further review of Access to the specialist computer publications. You won't be buying Office in order to have it, and you shouldn't feel pressured to use Access just because it comes with Office. But don't forget it's there. It's a heck of a way to learn database development. But note: There is no version for the Mac.

The latest Microsoft Office is a suite of excellent products for Windows, available as a group for way less than the sum of the parts. A bargain. On the Mac—an utter waste of money.

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On the Horizon

the environmental scanning newsletter for leaders in education

February/March 1995 • Volume 3 Number 3

Envisioning (and Inventing) the Future

Ian Wilson
Wolf Enterprises

Scenario planning is key to successful strategic management in these uncertain times, and key to envisioning and creating a "new future" for educational organizations.

In an earlier article for *On the Horizon* (Wilson, 1994), I argued that educational institutions, like corporations, need to engage in strategic management as they struggle to redefine themselves in new roles and changing conditions. To assist them in this change process, I also suggested that schools, colleges, and universities can benefit from two planning tools developed in the corporate sector: strategic vision and scenario planning. In this article I want to explore more fully the second of these planning tools—scenario planning—because it is, I firmly believe, key to successful strategic management in these uncertain times, and key to envisioning and creating a "new future" for educational organizations.

Let me, then, briefly address four questions: What are scenarios? Why are they needed? How do we develop them? How can we use them?

What Are Scenarios?

The term "scenario" is taken from the world of theater and film, and refers to a brief synopsis of the plot of a play or movie. In a planning context, scenarios can be described most simply, in colloquial terms, as "stories of possible futures that the organization might encounter." Scenarios are graphic and dynamic, revealing the flow of an evolving future. They are holistic, combining social, technological, economic, environmental, and political trends and events, the qualitative as well as the quantitative. They focus our attention on the "branching points" of the future, the potential contingencies and discontinuities.

By basing decisions on alternative futures and by testing planned actions against the different conditions these scenarios present, we are better able to prepare for uncertainty, and to ensure that our decisions are as resilient and flexible as possible to deal with contingencies that we might deem "unthinkable."

Why Are Scenarios Needed?

We have all been educated to believe that if we are to make decisions about the future of an organization, we must first know what the future the organization will have to deal with will be like.

On the face if it, that is a reasonable proposition. Yet in reality we are asking for the impossible—certainty and predictability in an uncertain world. The further out the horizon of forecasting, the more unreasonable is that demand. But even for the shorter term, the expectation of precision is a snare and a delusion.

In a profound sense, the future is unknowable. Yet, in a relative sense some things are predictable. We *can* do a respectable job of "sensing" the basic dynamics of the future and the alternative courses they might take. Building on this foundation,

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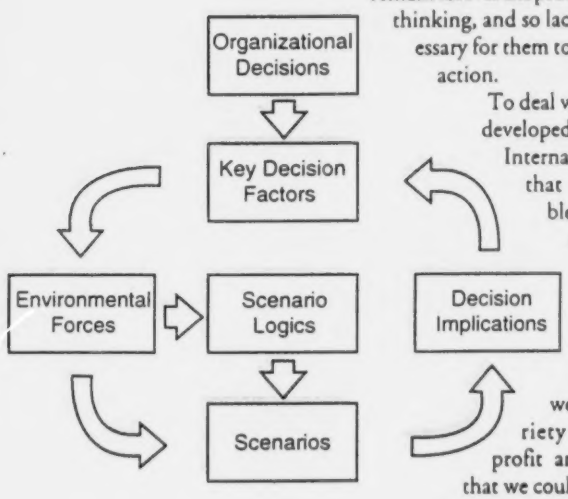
The process starts, *not* by plunging into a description of the future, but rather by clarifying the strategic decisions that we are faced with.

scenarios steer us on a middle course between a misguided reliance on prediction and a despairing belief that we can do nothing to envision the future.

How Do We Develop Scenarios?

One way to develop scenarios is to turn the job over to a brilliant futurist or an imaginative planner to sketch out alternative possible futures that our planning should consider. (Jay Ogilvy did exactly that for us in two earlier issues of *On the Horizon* [1994, April/May; 1994, June/July].) The fundamental problem with this approach, however appealing it might be, is that the decision-makers—those who will ultimately use the scenarios—do not "own" them: the scenarios remain forever the product of someone else's thinking, and so lack the credibility necessary for them to become the basis for action.



To deal with this problem, we developed, while I was at SRI International, an approach that (a) is a structured blending of rationality and intuition, and (b) relies on decision-makers themselves to develop their own scenarios. In this way we found, in a wide variety of organizations, profit and non-profit alike, that we could build into the process the highest degree of understanding and commitment to *use* the scenarios.

The approach utilizes a relatively simple six-step process (see schematic):

Step 1: Organizational Decision(s). The process starts, *not* by plunging into a description of the future, but rather by clarifying the strategic decisions that we are faced with, and that the scenarios should help us address. The decision can be as broad as the strategic future of the organization (e.g., "What vision of our future school/university should we pursue?") or as specific as the development of a new program (e.g., "Should we use electronic communications networks to promote individualized, off-campus/at-home educational programs?"). Clarifying the "decision focus" of the whole process is doubly important. In the first place, it reminds us that scenarios are not an end in themselves: they are a means to help us make better strategic decisions. Secondly, they must be grounded in our specific planning needs. A tight focus will prevent the scenarios from drifting into broad generalizations about the future of our society, thereby losing their implications for our particular organization.

Scenarios are not an end in themselves: they are a means to help us make better strategic decisions.

Step 2: Key Decision Factors. Having thought through the strategic decision we want to make, we need then to examine the key decision factors—the main things we would like to know about the future in order to make our decision. Granted that we cannot actually *know* the future, it would still be helpful if we had some "fix" on, say, potential student population, availability of funding, or the state of information technology in the year 2000 (or whenever our planning horizon is). Once again, clarifying in our minds what the essential decision factors are helps us focus the work-process on what is important for our planning purposes.

Step 3: Environmental Forces. Next, identify and assess key forces that will shape the future of these "key decision factors." You can think of these forces as falling into one of two categories—narrow-based trends that impact most directly and specifically on education, such as changing work force skill requirements, government's role in education, and "privatization" of schools; and broad-based trends, such as shifting demographic patterns, economic growth and income distribution, and the diffusion of information technology. The better we understand the multiplicity, interaction, and uncertainties of these forces, the more realistic our planning is likely to be and the better able we can be to prepare ourselves for sudden shifts in trends and the onset of what would otherwise be surprises.

Next, sort out these trends, ranking each in terms of its strength of impact on education and its degree of uncertainty (a simple "High-Medium-Low" scoring system will suffice). As a result of this sorting out, we can focus our attention on:

- "High impact/low uncertainty" forces—these are (we think!) the relative certainties in our future for which our planning *must* prepare.
- "High impact/high uncertainty" forces—these are the potential shapers of different futures (scenarios) for which our planning *should* prepare.

Step 4: Scenario Logics. This step is the heart of the process and establishes the basic structure of the scenarios. If we examine the "high impact/high uncertainty" forces, we will likely find that most of them can be grouped among two or three

Continued on page 5

FROM THE EDITOR

James L. Morrison
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Bionomics: A New Way of Thinking About Organizations

Michael Rothschild (1994) has developed a new management philosophy for the corporate world, bionomics, that combines economics with biology to push business leaders to examine what they do and how they do it, then improve upon it. Rothschild views the business world as an evolving ecosystem. Organizations must adapt or perish. Those organizations first adapting successfully will prosper the most. To maximize flexibility, corporations must decentralize; empower managers, supervisors, and workers; cross-train them; and incorporate computer networking technologies throughout the organization.

Rothschild argues that conventional economic thinking is based on the premise that future events can be measured with relative precision. However, econometric forecasting on the basis of historical data cannot take into account new developments. For example, in the past, economists could roughly predict how much air travel would increase if the economy grew a certain amount. Today, these forecasts have been compromised by the fax machine, computer networking, and video-teleconferencing via desktop computers. If corporate managers can use a desktop computer to see and interact with their colleagues around the country

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On the Horizon focuses on potential developments and critical trends affecting education. It is published in October/November, December/January, February/March, April/May, and June/July by the Institute for Academic and Professional Leadership, School of Education, The University of North Carolina at Chapel Hill. ISSN 1074-8121. Annual cost: individual, $24.50; organizational, $49.50; site license, $124.50. For more information, contact Professor James L. Morrison, Editor, *On the Horizon*, or Assistants to the Editor, Jonathan Barker, Adam Bianchi, K.C. Brown, Sharon Moore, Robbi Pickeral, or Clari Ternill, CB# 3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599. (919) 962-2517. Internet: Morrison@unc.edu.

The Institute for Academic and Professional Leadership serves educational leaders by providing professional development workshops and seminars. For more information about the Institute, its facilities, and its services, contact William S. Pate, Program Director, The Friday Center, CB #1020, UNC-Chapel Hill, Chapel Hill, NC 27599. (919) 962-3276. Internet: iapl@unc.edu.

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We need to incorporate planning methodologies that help us address an uncertain future.

or around the world, how many business trips will be canceled, regardless of the health of the economy? Because the future is unknowable, the best that organizations can do is maximize flexibility and aggressively pursue opportunities as they come on the horizon.

Although written for business leaders, Rothschild's thesis is applicable to educational leaders. The world is changing rapidly. We need as much lead time as possible to adapt to the challenges of these changes in order to provide effective educational programs. To do this, we need to not only continue decentralizing educational organizations (e.g., in public schools, magnet schools, site-based management) and incorporating computers and telecommunications technology (e.g., e-mail, distance learning), but we need also to incorporate planning methodologies that help us address an uncertain future.

Ian Wilson describes one such method, scenarios, in our lead article. Coincidentally, Ian and I are leading a seminar July 1995 at Saint Andrews University, Scotland, that focuses on the implications of global change, and how to use scenarios to address these implications. The seminar focus and agenda are described in the insert below. Participants will receive a handbook and a copy of the proceedings. For registration information, please contact our office or complete the registration form online in our WWW site at the following URL address: http://sunsite.unc.edu/horizon.

[Rothschild, M. (1994). *Bionomics: Economy as ecosystem*. New York: Henry Holt.]

The Fifth Global Change Strategic Management Seminar for Educational Leaders

Sponsored by *On the Horizon*

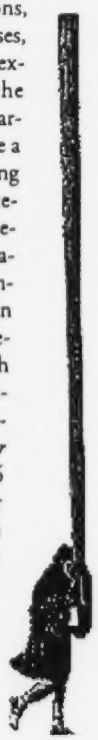
New Hall, University of Saint Andrews, Scotland, 27-31 July 1995

This seminar is a response to the on-going world wide redefinition of the roles and responsibilities for education in an information age. The economic context and the allocation of resources will surely change. Technological developments in telecommunications and computers will transform the way we live and work—and educate—in the 21st Century. Exactly what these differences will be and how they will evolve is anybody's guess. One thing is certain: the only way any educational organization will come out a winner is if it is prepared (for changes in its clientele and market), imaginative (in its repositioning strategy), and proactive (in its execution).

The purpose of this seminar is to provide educational leaders with the tools they need to respond to these challenges:

- Strategic management—to ensure constant, continuous adaptation to changing markets
- Scenario planning—to help develop strategies for an uncertain future
- Strategic vision—to give a sense of purpose, direction, and motivation to the organization
- Scanning and monitoring—to provide the constant flow of intelligence needed for strategic management.

Seminar effectiveness relies on an appropriate mix of formal presentations, small group exercises, and professional exchanges among the participants. All participants will receive a handbook describing and illustrating strategic management, scenario planning, strategic vision, and scanning/monitoring. In addition, they will receive a copy of each briefing paper presented by participants (See *Call for Briefing Papers*, p. 16). Finally, seminar participants will be mailed a copy of the proceedings and the informational findings resulting from the seminar exercises.



Abbreviated Seminar Agenda Topics

Thursday, 27 July 1995

Afternoon registration, dinner, reception

Friday, 28 July

The future societal context for education: Strategic forces for change

The nature and purpose of strategic management: lessons from corporate experience

Adapting the corporate model to the world of education

Scenario planning: Dealing with an uncertain future

Uncertainties in education's future

Developing scenarios: Review of the methodology

Panel discussion on challenges of global change (summary/discussion of prepared briefing papers)

Saturday, 29 July

Developing scenarios of education's future (possibly using Saint Andrews as an illustration):

- Building the scenarios' structure
- Fleshing out the scenarios
- Interpreting scenarios: Identifying issues, developing strategies
- Interpreting the scenarios

Panel discussion on planning systems designed to meet the challenges of global change (summary/discussion of prepared briefing papers)

Sunday, 30 July

The power of strategic vision (what it is, why it is needed, how it is developed, what are its benefits)

Developing a strategic vision (for "target" institution[s])

[The afternoon will be open to attend the local Highland Games. The person at the left is tossing the caber, just one of the sports activities at the Games.]

Monday, 31 July

Linking planning to action: The critical importance of implementation

Strategic intelligence: The need for continuous scanning and monitoring

Discussion of seminar results: "What I plan to implement/change on my return"

Perhaps the most obvious way to use scenarios is to employ them, in effect, as "test beds" for the organization's current strategy.

The powerful feature of scenarios is that they stretch the envelope of our thinking, both about the future *and* about our strategies.

continued from page 2

critical "axes of uncertainty." Each of these axes presents two opposite "logics"—different views or theories of "the way the world might work" in the future. For example, one axis might pose the alternative views that "education will continue to be primarily a public sector responsibility" or "privatization of education will increase dramatically as the role of government in our society decreases." (Bear in mind that these are polar opposites, with intervening mid-points; but the essence of scenarios is *not* to examine *every* possibility, but to force our planning to consider the possibility of *drastically different* futures.)

The interplay of these axes and their alternative logics will present us with the basis for selecting three to four scenarios we believe effectively bound the "envelope of uncertainty" that faces our organization.

Step 5: Scenarios. What do we end up with? What do scenarios look like? There are many forms that scenarios can take, but I have found that the three most important features are:

- Compelling "story lines"—Remember: scenarios are not descriptions of end-points (e.g., what does education in the year 2000 look like), but are narratives of how events might unfold between now and then, given the dynamics ("scenario logics") we have assigned to that particular scenario. These story lines should be dramatic, compelling, logical, and plausible.
- Highly descriptive titles that convey the essence of what is happening in each case. (Jay Ogilvy, for instance, titled his scenarios *The Information Revolution*, *Education Inc.*, and *The New Educational Order*.) After people have read the story lines, they should find the titles to be memorable encapsulations of the scenario.
- A table of comparative descriptions to help planners and decision-makers see how the scenarios differ along given dimensions (e.g., student-body demographics, available funding, business-education partnerships).

Step 6: Decision Implications. This is the stage at which we seek to interpret the scenarios, linking them back to the strategic decision(s) we focused on in Step 1. Perhaps the simplest and most direct approach is to answer two questions:

1. What are the main opportunities and threats that each scenario poses for our organization?
2. How well prepared are we (or can we be) to seize these opportunities and obviate or minimize the threats?

How Can We Use Scenarios?

Beyond the opportunities/threats assessment exercise in Step 6, there are several approaches to using scenarios in strategy development that are worth considering. Let me just touch on two of these approaches.

Perhaps the most obvious way to use scenarios is to employ them, in effect, as "test beds" for the organization's current strategy. What is a "strategy"? In simple terms, a strategy deals with the "how," "when," and "where" of an organization's actions to achieve its vision. Every organization has a strategy (although often it is not clearly spelled out), so this use should always be possible. This exercise can be as straightforward as a judgmental assessment by planning committee members as to how well (or badly) the strategy "plays out" in each scenario. A start would be to go through an opportunities/threats assessment (see above), and then to use this assessment to address a second set of questions. Are we satisfied with the resilience of our current strategy, its flexibility to deal with different possible conditions? Are there things we could do to improve its resilience? And (importantly) are there contingency plans we should put in place to help move in a different direction, should that be necessary?

Scenarios stimulate us to explore *new* strategy options. Look at it this way: scenarios portray different futures, and these different futures would obviously require different strategies. The difficulty lies in not knowing *which* future will evolve. We can, however, go beyond evaluating current strategy to exploring these new options, scenario by scenario. We do not have to develop a complete strategy for each scenario; we need merely use our imagination to start some "what if" thinking. Frequently we will find that a new option, one that we thought of in connection with, say, a "High Privatization" scenario, might be a good action to take in any case; maybe not to the same extent, but a "good bet" surely.

The fundamental argument for scenario planning goes somewhat like this. In an age of incremental change, it is safe to say that incremental changes in our strategies will suffice. However, an age of discontinuities and massive uncertainties requires discontinuous strategies, sometimes radical changes from past practices. The powerful feature of scenarios is that they stretch the envelope of our thinking, both about the future *and* about our strategies.

[Ogilvy, J. (1994, April/May). The information revolution. *On the Horizon, 2*(4), 1-2, 4; Ogilvy, J. (1994, June/July). Education in the 21st century. *On the Horizon, 2* (5), 1-2; Wilson, I. (1994, February). The strategic management of higher education: Lessons from corporate experience. *On the Horizon, 2*(3), 1-2.]

SOCIAL

Lois Graff
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The liberal arts represent the best education for meeting the complex demands of the twenty-first century.

Many business leaders fault liberal arts programs for not developing good work habits, not encouraging maturity and independence, not promoting ethical behavior, and lowering academic standards.

What is an Undergraduate Education All About?

Richard Hersh, President of Hobart and William Smith Colleges, with support from AT&T, commissioned a study (1994) to assess public attitudes toward liberal arts education.

Hersh began his study with the long accepted assumption that the liberal arts represent the best education for meeting the complex demands of the twenty-first century. He found to the contrary that today's parents and students placed higher value on salable technical skills necessary to find and fill the all-important first job. He also found that although the business community gives lip service to valuing a liberal arts education (e.g., communication skills, foreign languages and cultural understanding, critical judgment, flexibility, and a sense of responsibility and ethics), they also report a "disconnect between current [liberal arts] programs and the ideal." Many business leaders fault liberal arts programs for not developing good work habits, not encouraging maturity and independence, not promoting ethical behavior, and lowering academic standards.

[Marchese, T. (1994, November). What our publics want, but think they don't get, from a liberal arts education, Ted Marchese interviews Richard Hersh. *AAHE Bulletin*, 47 (3), 8-10.]

Implications

Whether a liberal arts education or a professional school education really provides the "best" preparation for life is an old argument. The point is, that's not the point.

None of the primary concerns voiced by the business community or the critical values attributed to a liberal arts education corresponds to the content knowledge being delivered. The potential value of an undergraduate liberal arts degree should be the development of process skills and character attributes.

However, members of the liberal arts faculty, including those on college-level curriculum committees, concentrate on content and the relative amount of time allocated to each of the respective content areas, rather than on so-called life-values.

And why not? The training and preparation as well as the promotion, tenure, and mobility of an individual faculty member is closely tied to the content area of expertise. Promoting such things as good communication skills or a sense of responsibility does not go very far toward achieving the professional aims of faculty. Nor are they as easy to assess as is whether or not a student knows a particular fact or can use a given formula.

Let's assume for a moment that we view this from the perspective of an individual institution that embraces the mission of personal and professional development of its students.

Its first step would be to define such development and to define the role of faculty in that process. The process would have to determine how to measure success as an institution and how to measure a faculty member's success within the organization.

One problem with changing the process is that mobility between institutions demands loyalty to the profession as defined by content area. The health of the institution, as well as the satisfaction of the individual, requires that this mobility be maintained. Adding substantial developmental responsibilities to the plate would mean allowing some of these duties to the profession to slip. Also, sharing in the responsibility for curriculum emphases would involve many other individuals who complete each student's "board of advisors."

Change is the operative word, or in this case, the *co*operative word for attacking the problem. The challenge is to bring stakeholders together in open discussion to develop consensus on the objectives of the system, mutual understanding of what each would like to receive from the system, and a determination of what each can contribute. This is a very different model than the faculty-content-centered process in place in most educational institutions today; it requires that faculty let go of some of its prerogatives in order to meet the needs of the whole. It implies a more meaningful role for business partners, for university staff, for parents, and for students themselves, and perhaps a different definition of an academic "course."

CALL FOR MANUSCRIPTS

On the Horizon articles take two forms: abstracts of one or more articles/books/Internet postings that have implications for education or essays on emerging trends, or on developments that may affect the future of education. A unique feature of both abstracts and essays in *On the Horizon* is that authors speculate on the specific implications of these "signals of change" in the macroenvironment (the STEEP sectors) for educational leaders. Abstracts and essays are brief—800 to 1,000 words (our readers are busy leaders who want to get to the bottom line quickly).

Please mail your abstracts or essays to James L. Morrison, School of Education, CB 3500 Peabody Hall, UNC-Chapel Hill, Chapel Hill, NC 27599 or e-mail them to Morrison@unc.edu.

TECHNOLOGICAL

Andy Carvin
The Corporation for Public Broadcasting

The Electronic Field Trip: No Bag Lunch Required

As a group of scientists and researchers prepare for their next adventure into the heart of the Amazon, they pack the usual array of necessities for the trip: passports, photographic equipment, malaria medicine, and maybe even a cellular phone. But thanks to recent advances in both telecommunications technology and curricular planning, these intrepid explorers may now include something that until recently would have been considered unheard of, if not bizarre: the e-mail addresses for several dozen middle school classes around North America.

The electronic field trip, or cybertrip, is now one of the hottest uses of computer networking in education today.

Gone are the days when a class trip evoked images of parental consent forms, bumpy bus rides, and ant bites. The electronic field trip, or cybertrip, is now one of the hottest uses of computer networking in education today. The premise of the cybertrip is simple enough: scientists, teachers, and other experts go to a specified location equipped with portable computers, an Internet connection, and sometimes a video camera for a satellite linkup. As they conduct experiments and observe their surroundings, the team interacts with young students by way of e-mail exchanges and other communicative means.

For example, Maryland Public Television and Geoff Haines-Stiles Productions, in conjunction with NASA's Ames Research Center, have begun a series of electronic field trips known as *Passport to Knowledge*. The current adventure, *Live from Antarctica*, links classrooms in the U.S. with a team of scientists as they study the continent, from McMurdo Base to the South Pole. As the students study polar climate, penguin feeding habits and other related subjects, the scientists conduct experiments tied to the work of the kids. An automatic e-mail distribution system known as a listserv relays student queries to the team; the researchers respond with data. Teachers have their own listserv as well, in order to discuss possible new directions for the cybertrip. And to add additional flavor to the project, all participants are united by way of regularly scheduled satellite telecasts, aired on closed circuit TV, public television, and NASA's channel, NASA Select.

Virtual field trips will mean new adventures across time and space, thanks to the creative implementation of electronic reality and telepresence.

Cybertrips such as *Live from Antarctica* actively integrate two innovative trends in education: distance learning and collaborative learning. Assisted by a networked computer, students in a classroom may "take part" in a professional field experiment. The Internet is used to transmit text, audio, images, even video data to and from any part of the world. Students are able to talk with scientists about research, and can interject their own interests and concerns as the project proceeds. Scientists visit sites and test student theories. On-line interaction is blended with traditional lesson planning. Students in each class may be required to keep journals and prepare similar experiments. But no matter how a given cybertrip is arranged, one key component remains static—students and exploration team members treat each other as colleagues. Mutual respect translates into a mutual gain of knowledge, so both sides are enhanced by distant collaboration.

What is the future of student-researcher collaborations? Will they catch on, given that scientists are busy and may not have time to interact with young kids asking rudimentary questions? Won't a Stephen Hawking or a Roger Penrose grow weary of ever-increasing E-mails by 14-year-olds interested in black holes? Roger Schank, Director of Northwestern University's Institute for the Learning Sciences, noted this concern when he quipped, "I, along with other professors I know, can't wait until there are hundreds of such questions a day" (Shank, 1994). Fortunately, the controlled environment of the cybertrip lessens redundancies. Discussions are moderated by teachers and project leaders, so no researcher is swamped while trying to conduct scholarly work. In the end, intensive field research and student-scientist interaction can be achieved in a well-planned project.

With each passing month, numerous organizations around the world sponsor new geographic cyberadventures for kids. But the potential of these adventures goes beyond the mere exploration of the globe.

For example, *Passport to Knowledge* field trips are extraterrestrial (*Live from the Stratosphere*, *Live from the Hubble Telescope*) and chronological (*Live from the Ice Age*, *Live from Pompeii*). From the students' point of view, virtual field trips will mean new adventures across time and space, thanks to the creative implementation of electronic reality and telepresence. Not all students are able yet to participate in this new environment, but what is available for some students today is certainly just around the corner for all students in the future—much sooner than we might think.

[Schank, R. (1994, Spring). Why hitchhikers on the information highway are going to have to wait a long time for a ride. *The Aspen Institute Quarterly*, 6 (2), 28-58]

[Editor's note: For more information on Passport to Knowledge, write Live from Antarctica, PO Box 1502, Summit, NJ 07902, or contact Geoff Haines-Stiles at ghstiles@ll.pbs.org. You may visit the NASA Ames Server by way of gopher (gopher://quest.arc.nasa.gov) or WWW (http://quest.arc.nasa.gov).]

ECONOMIC

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The Global Paradox: Going Global Regionally

The Post WW II Paradigm Shift: The End of Going it Alone?

This year marks the 50th anniversary of two of the world's most important global institutions—the International Monetary Fund (IMF) and the World Bank, both of which stemmed from the 1944 Bretton Woods Agreement to provide a set of guidelines to govern the exchange of goods, services, and money among nations in order to maximize the benefits stemming from free trade and investment.

The ink had barely dried when the first signs of the need for additional agreements became apparent. Despite the intuitive appeal of "free trade benefits everybody," the desired frictionless flow of goods, services, and money ran into unexpected hurdles—tariffs. To overcome tariffs, 23 countries, representing half of the world's trade, met in Geneva, April-October 1947, and negotiated some 45,000 agreements regarding the reduction and binding of individual tariff levels—the first General Agreement on Tariff and Trade (GATT).

The IMF, the World Bank, and GATT have come under severe attack. Many scholars, especially those from Europe, declare that the IMF and the World Bank have "outlived their usefulness." The GATT, after barely surviving the Uruguay Round, has not been ratified by the European Union (EU) or Japan, who await the outcome of the U.S. Congress. In the U.S., proponents herald the GATT as the "biggest tax cut for U.S. citizens," whereas opponents urge citizens to call their congressman to vote against the "disastrous GATT that will have a bunch of third world dictators dictate U.S. policy" (Nader, 1994). Sir James Goldsmith, the well-known corporate raider, argues that "free trade will unleash social instability" (Farell, 1994).

The recent controversies surrounding the United Nations (UN), Organization of Economic Cooperation and Development (OECD), IMF, the World Bank, and the GATT are but the visible symptoms of a latent disenchantment with attempts to address global issues and concerns. During the 80s, the Reagan administration refused to make U.S. payments to the UN and some of its World Bank obligations as well, telling the UN to shape up and streamline their operations to reflect the 1990s. Although President Clinton has reached an agreement with Senator Dole to support the 22,000 pages of tariff schedules and country-by-country regulations of the GATT accord, U.S. passage of the GATT legislation is no guarantee that its newly organized successor, the World Trade Organization (WTO), will be treated more kindly.

Economic collaboration among nations seems to be undergoing a marked change. Instead of global integration, the current mood favors regional cooperation. For example, the U.S. seems to be pursuing a two-tier economic policy.

By 2020, more than 75% of the world's population and wealth will reside with the APEC area.

The New Paradigm: Regionalism

Economic collaboration among nations seems to be undergoing a marked change. Instead of global integration, the current mood favors regional cooperation. For example, the U.S. seems to be pursuing a two-tier economic policy. The first tier is economic integration and involves expanding the North American Free Trade Agreement (NAFTA) to South America. Chile has already initiated talks about joining NAFTA. The second tier is economic cooperation (e.g., the Asia-Pacific Economic Cooperation [APEC] accord). In either case, global cooperation as represented by OECD is not in vogue.

At the moment, the searchlights are directed towards APEC. Seventeen nations were represented in last December's meeting in Jakarta. Besides the 12 charter members from APEC's founding in 1989—the Association of the South East Asia Nations (ASEAN), Australia, Canada, Japan, The Republic of Korea, New Zealand, and the U.S.—APEC now includes China, Hong Kong, Taiwan, Mexico, Papua New Guinea, and Chile. By 2020, more than 75% of the world's population and wealth will reside within the APEC area. Between now and then, a massive reconstruction of the area's infrastructure and infostructure will be completed. *Business Week* estimates reach the one trillion dollar mark for the Asian infrastructure alone (Holstein, 1994). American businesses are staking their futures in the Far East; they interpret APEC as a good start.

[Farell, C. (1994, December 5). Sir Jimmy Goldsmith goes jousting at GATT, *Business Week*, 36; 4; Holstein, W. J. (1994, November 20). Building the new Asia. *Business Week*, 62-68; Nader, R. (1994, November 28). CNN TV ad.]

Implications

If you are confused with the entire issue of economic integration, free trade, and globalization, you are not alone. The entire matter of providing for infinite human wishes and wants in a finite life support system, the earth, is indeed perplexing. For example, while the U.S. administration pursues open regionalism in its quest to provide a respectable economic well-being for its citizens, California citizens are fiercely pursuing a "lingering isolationism" with the anti-immigrant referendum.

What must we do? Schools must teach current reality. At the primary school level, children must be trained to look East, to the future, where the action is, and not West, to the past, where the history is. In addition, children must be exposed

to the futility of countries "going it alone"; they must be taught the virtues of the three Cs—communication, cooperation, collaboration.

What about universities? Many university administrations view with suspicion proposals by faculty members wishing to start a strategic alliance with an Asian institution. Some taxpayers resent the large numbers of Asian students in their schools. And yet agreements such as APEC and NAFTA require professionals with open minds and collaborative moods. Universities must promote new educational programs and alliances that enhance training professionals for this new world of economic cooperation. Finally, universities must re-engineer their curricula around the regionalization process that seems to be here to stay as the new paradigm shifts towards the twenty-first century.

ENVIRONMENTAL

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Science and Evidence in Environmental Risk Analysis

The role of science in environmental decisions has increased dramatically with the rise of risk analysis as a tool used by policy makers. The goal of risk analysis is to find the major kinds of risk in the environment, describe their sources, estimate the degree of threat to human health and ecosystems, and provide this information to policy makers in a way that is understandable to non-specialists (Covello & Merkhofer, 1993). In its more creative form, risk analysis also helps to rank environmental risks, allowing policy makers to focus resources on those risks that are most significant, and to suggest the conditions in which a pollutant poses a risk. Once these conditions are known, environmental policies can be designed to avoid them.

The role of science in environmental decisions has increased dramatically with the rise of risk analysis as a tool used by policy makers.

Benefits of risk analysis are limited, both by need and by quality. For example, some environmental problems are so obvious that detailed scientific study is not called for (e.g., odors from hog farms); whereas others, such as arsenic in drinking water, are not obvious to the casual observer and serve a vital purpose. But defining the worthy risk-items and choosing options for their solution require a top quality of science upon which to rest useful predictions. Faulty predictions could result in drawing valuable resources away from truly substantial risks.

Science, Uncertainty, and Judgment

What are the tools for judging the quality of science? Most are found in "uncertainty analysis," a distinct part of risk analysis in which analysts describe how confident they are in each prediction. These methods were developed in engineering and statistics to deal with problems of the reliability of systems such as nuclear reactors, and they are studied as a way of dealing with the problem of making decisions under uncertainty (Morgan & Henrion, 1990). Although useful for engineered systems where uncertainty can be measured by the rate at which accidents have taken place, they are less satisfactory for problems of environmental risk. Why? Scientists aren't faced only with a problem of measuring rates at which environmental damage takes place; they also are faced with a conceptual problem of defining "damage" and predicting rates using theories of an environmental system that may be understood poorly.

All of this means risk analysts must consider more than the classical scientific aspects of uncertainty. They must consider: (a) the quality of evidence, including not only questions of statistics but also questions of the bias and competence of people collecting that evidence; (b) the process of reasoning by which scientists draw conclusions from this evidence; (c) the human judgments that must be made in "weighting" different kinds of evidence into an estimate of risk; and (d) the reasons for differences of judgment between groups of scientists. Risk analysts must decide what is "acceptable evidence" for a prediction of risk that will find its way into environmental decisions (Mayo & Hollander, 1991; National Research Council, 1995). These problems aren't usually discussed in statistical, engineering, or even environmental science literature. They are problems in psychology, sociology, and philosophy. They are issues of how "quality" should be defined and judged and factored into decisions. They are issues of the humanities rooted firmly in a culture that insists on excellence in decisions.

[Covello, V. & Merkhofer, M. (1993). *Risk assessment methods: Approaches for assessing health and environmental risks.* New York: Plenum Press; Mayo, D. and Hollander, R. (Eds.) (1991). *Acceptable evidence: Science and values in risk management.* New York: Oxford University Press; Morgan, M. and Henrion, M. (1990). *Uncertainty: A guide to dealing with uncertainty in quantitative risk and policy analysis.* Cambridge: Cambridge University Press; National Research Council.

Education must prepare students to analyze the quality of predictions from environmental risk analysis.

(1995). *Science and judgment in risk assessment.* Washington, DC: National Academy Press.]

Implications

Environmental science has its foot first and foremost in the sciences. From that base, the field has stepped out into the social sciences, particularly into the fields of economics, sociology, geography, and anthropology. These remain important areas of study in gaining a complete appreciation for the complexity of environmental problems. More attention must be directed towards the humanities. Education must prepare students to analyze the quality of predictions from environmental risk analysis, and to compare this quality against culturally valid standards of excellence. Environmental education must include a stage at which students prepare summaries of scientific predictions, and must use humanities-based environmental analysis to convince others of the reasonableness of their predictions as a foundation for environmental decisions.

POLITICAL

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Studies indicate that both the Danish public and political leaders are better informed on issues tackled through this approach than are persons in other countries facing similar issues.

Citizen Consensus Conferences Point to Better Political Decisions

A new approach to political decision-making is emerging from Europe. First utilized in Denmark, the citizens consensus model puts public policy questions before small but representative groups of lay people, provides them with the resources of an expert panel comprised of persons with differing viewpoints, and results in a report that can be broadly distributed and debated by members of the public.

For example, the Danish Board of Technology (a group analogous to the U.S. Office of Technological Assessment), seeking to shed light on a particular public policy question in its domain, selects a representative group of 15 Danes from among the respondents to an advertisement. The group, comprised totally of regular citizens from all walks of life, drafts a set of questions based on a background paper supplied by the Board, which forwards the list to a specially selected panel of experts with widely divergent views from the scientific, technological, business, and labor communities, as well as from ethicists and social scientists. The responses of each panelist are reviewed by the lay group, who may decide to replace some members of the expert panel. The process culminates with a three-day conference, open to the media and the public. Expert panelists make opening presentations, members of the lay panel pose follow-up questions, and then the lay panel cross-examines the expert panel. The lay panel prepares a report, summarizing the issues on which it reached consensus, and characterizing the remaining points of disagreement. The report is then released to the press and disseminated by the Board, which hosts local debates on the topic.

Some 600 local debates have been held on biotechnology matters alone. Studies indicate that both the Danish public and political leaders are better informed on issues tackled through this approach than are persons in other countries facing similar issues. The success of the citizens consensus model in Denmark has led to its implementation in the Netherlands and the United Kingdom (Sclove, 1994).

A similar model has been tested by the League of Women Voters in the U.S. through their "citizens' jury" model, whereby a representative group of citizens poses a series of questions to candidates for major office, studies their written responses, examines representatives of the candidates, and then prepares a report citing the strengths and weaknesses of each candidate on each issue. The citizens jury received praise for its deliberations in the 1992 U.S. Senate race in Pennsylvania between Arlen Specter and Lynn Yaekel, as well as in the 1994 Pennsylvania gubernatorial election between Tom Ridge and Marc Singel.

[Sclove, R. (1994, November 17). Citizen-based technology assessment: An update on consensus conferences in Europe, Originally posted as Loka Alert 1-12 on Loka-List (address unavailable); reposted on Futurework List (futurework@csf.colorado.edu) on January 3, 1995.]

Implications

Ross Perot and others have suggested that legislative leaders should take the pulse of the people on important public policy matters through electronic town meetings. Although on its face such an approach would provide ordinary citizens the opportunity to make their views known at a

The Danish model of helping a group of ordinary people to grapple with a public policy matter offers a promising opportunity for the development of an informed consensus upon which political determinations can be made.

Although the Middle States Association has a deservedly strong reputation, many private accrediting groups have not maintained high standards.

time when it would count, the electronic town meeting, absent a full understanding of the complexities of the issue on the part of the persons providing the input, would result in uninformed (and potentially dangerous) decision-making. The Danish model of helping a group of ordinary people to grapple with a public policy matter offers a more promising opportunity for the development of an informed consensus upon which political determinations can be made. Educators, particularly those interested in lifelong learning, should seize the opportunity to advance democracy by advocating this gridlock-busting model.

U.S. Cities Without a Chance?

In late December, the federal government gave Christmas presents in the form of empowerment zone grants and tax breaks totaling $3.5 billion to eight cities, including New York and Atlanta. However, according to former Albuquerque mayor and urban theorist David Rusk, six of the cities—Philadelphia and Camden, NJ (which share a grant), Baltimore, Chicago, Cleveland, and Detroit—are among 24 American cities that have passed a "point of no return," as gauged by the following factors: a 20% decline from peak population, a minority population exceeding 30%, and a per capita income no more that 70% of suburban income. Rusk's study of 522 cities leads him to conclude that the extreme racial and economic isolation of the 24, along with their "inelastic" geography, renders each incapable of turning itself around by what the city does within its own borders. The remaining 18 cities on the endangered list include Atlantic City, Benton Harbor (MI), Birmingham, Buffalo, Dayton, East Chicago, East St. Louis (IL), Flint, Gary, Hartford, Holyoke, Newark, New Haven, North Chicago, St. Louis, Saginaw (MI), Trenton, and Youngstown.

Rusk notes that cities such as Houston, Raleigh, and Nashville that have been free to expand their boundaries through annexation of newly developing suburbs have been able to maintain a middle class base and have retained a level of social integration, with the children of every race and class attending the same school system. On the other hand, the inelastic cities have become "the sociological equivalents of giant public housing projects."

[Montgomery, L. (1994, December 23). Grants may be going to hopeless cities, *Philadelphia Inquirer*, p A4.]

Implications

To avoid what Rusk posits will occur (that the point of no return will eventually extend beyond the 24 cities to their suburbs) as well as to build a constituency that understands the broad benefits of rescuing the center cities, educators must provide leadership in forging alliances between central cities and suburbs (including educational alliances) as an indication of their "walking the talk."

Regulation vs. Voluntary Accreditation

At their annual conference held in Philadelphia in December, officials of the Commission on Higher Education of the Middle States Association of Colleges and Schools criticized the federal government for tampering with the long-standing practice in higher education of private, voluntary accreditation. In accordance with rules by the U.S. Department of Education last summer, accrediting agencies must set standards for program length, tuition, fees, and student loan defaults, and must conduct unannounced visits to any institution offering "vocational education." Responding to the complaint, David Longanecker, Assistant Secretary for Postsecondary Education, acknowledged that the 1992 law upon which the regulations were based "fundamentally change[d] the relationship between the accrediting bodies and the federal government, from voluntary to sort of voluntary-mandatory."

[Goodman, H. (1994, December 3). Group targets U.S. rules on colleges, *Philadelphia Inquirer*, p. A2.]

Implications

Although the Middle States Association has a deservedly strong reputation, many private accrediting groups have not maintained high standards. Further, the now-defunct Council on Postsecondary Accreditation (COPA), the association of accrediting associations, was never able to engender among its membership the need to enforce adequate minimal standards, particularly in regard to low graduation rates and high student loan default rates. Given the magnitude of public funds involved in postsecondary education, educators involved in and favoring voluntary accreditation must assure the application of high standards in the accreditation process. Otherwise, the public, concerned for the effective use of tax dollars, may insist on regulatory accreditation.

COMMENTARY

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Thinking About Educational Reform

In the October/November issue of *On the Horizon*, Richard Heydinger proposed a new organizational model for U.S. public higher education; and in the December/January issue, James Coleman, perhaps America's finest sociologist of education, offered ideas for "redesigning" the public schools. These two articles have stimulated a range of emotions in me, from celebration to dismay.

Heydinger, as you recall, proposed a radical "new organizational paradigm" that would put college students, or "the customers," as he calls them, in charge of their educations. And he would create a super coordinating board in each state, with a series of sub-boards, educational banks, and separate enterprises under that superboard to make sure the "needs of the customers" were served. In effect, each state would buy or contract for professors and facilities to give undergraduates what they wanted.

Now, I can only endorse the desire to have professors serve the students more and their own interests less. Too much of higher education is currently arranged for, structured, and fractured for the benefit of faculty members. But students are not always able to see what they "need" in their education to fulfill their aspirations. Or, they see the need but avoid it, as some of my graduate students in higher education studies did when they tried to duck out of mastering statistics. The student-run alternative colleges of the 1960s and 1970s were largely a disaster, with courses on such subjects as Che Guevara's tactics and belly-dancing, and with pitifully little study of major texts or methodology.

What is needed in higher education today is a better balance of student wants, faculty proclivities, and society's needs, not a lunge toward full consumerism.

What is needed in higher education today is a better balance of student wants, faculty proclivities, and society's needs, not a lunge toward full consumerism. The performance of most state coordinating boards hardly suggests that we should place hope in such bodies. There is also the giant matter of who will conduct basic and applied research for the nation if professors are hired on short-term contracts only to deliver instruction to their "customers."

Richard Heydinger, a bright, former vice president at the University of Minnesota, is passionately devoted to shifting more control to college students and forcing professors to be more responsible toward the education of the country's better young minds. But his organizational "paradigm" seems perilously close to a marriage of corporate outsourcing and TQM with the old Soviet Politburo. Customer service or else!

James Coleman's article suggested that public schools might flourish if only they were no longer "administratively driven" but became "output driven"; and if they had external standards imposed as the "basis of all evaluations of student performance," with tangible annual rewards for student and teacher achievements. Coleman offered three possible designs.

Design number one proposed teacher collectives with "no school principal" and with any group of teachers able to set up their own school. A second idea was to employ selected students in the middle and high schools as assistant teachers in the lower schools and to pay them for their work. The third design substituted interscholastic competitions for external standards, thus initiating a kind of academic NCAA of schools with "individual and team rankings."

Awed as I am by Coleman's many superb contributions to the sociology of education, and by the imaginative daring of these redesigns, I am baffled by his essay. In his famous 1966 *Coleman Report*, he found that schools "bring little influence to bear on a child's achievement that is independent of his background and social context." And in a marvelous article in the August/September 1987 *Educational Researcher* called "Families and Schools," Coleman argued for the indispensability of "social capital," or the bundle of outside parental, religious, community, and other supports for public school studies. How is it that he can now think that tinkering with school organization, or eliminating principals, will suddenly reform American public education?

The fundamental flaw of the gush of school and college reform proposals is their narrow focus on schools and colleges, as if society could be beautiful if only we fixed the schools.

In my view both the Heydinger and Coleman articles neglect the crucial role of what Coleman calls "social capital." The fundamental flaw of the gush of school and college reform proposals is their narrow focus on schools and colleges, as if society could be beautiful if only we fixed the schools. The 13 or 14 years of formal schooling and 4 years of college is a very long stretch of passive, isolated, bookish work during the most restless, exploratory, athletic, sexually active time in a young person's life. It can be sustained only with strong family backup and the support of other community forces and enticements.

Great teachers can make a huge difference. So can structural change in the schools and colleges. But even the most inspiring teachers cannot deliver if most students disdain the enterprise and are not encouraged by non-school pressures to study for their long-term interests. Only a military-like setting can teach those who look at schooling as a mandatory and overly long apprenticeship that is often irrelevant and boring.

If we wish to redesign our schools and colleges for the future, we must understand that our old-time educational institutions are enmeshed in a newly powerful tangle of social and educational forces that now shape a young person's values and

We must understand the different role that public schools and colleges play in the novel, information-rich, highly technological, and internationally-attuned society we have entered.

learning: radio, peer groups, newspapers and magazines, families, television, religious leaders and groups, rock and rap music, theaters, drugs, race relations, computers, sports, political debates, cinemas, public libraries, youth groups and gangs, part–time work and chores, and more.

Historian Bernard Bailyn warned us in the 1960s with his tiny gem, *Education in the Forming of American Society*, about the danger of reformers who "directed their attention almost exclusively to the part of the educational process carried on in formal institutions of instruction." Formal schooling is not the same as education. In our time, schools and colleges may be becoming less influential, as certain traditional supports for formal schooling such as family, religion, and the local or ethnic community wither, and new forces such as television, popular music, and sports become more dominant shapers of young people's behavior, values, and the desire to learn.

As Lawrence Cremin advocated in his brilliant little book, *Public Education*, we urgently need a new "ecology" of education. To be effective, we must understand the different role that public schools and colleges play in the novel, information-rich, highly technological, and internationally-attuned society we have entered—without forgetting that a more highly trained and intellectual population is essential for any country to compete in the future. Abraham Lincoln said it well of another traumatic period in American history: "The dogmas of the quiet past are inadequate to the stormy present. As our case is new, so we must think anew. We must disenthrall ourselves."

IN THE 'NET

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The World Wide Web: The Killer Application for Education?

The World-Wide Web (also known as WWW, the Web, and W3) is a lattice of interconnected computer sites that all share a format called hypertext markup language (HTML), which makes it possible to link text, sounds, even video, on one site to any other site in the world. The Web is viewed as the first real step to the creation of an "information superhighway," but for all of its profit-making and curiosity-seeking potential in the corporate and research worlds, the Web has largely been ignored as a powerful pedagogical tool. What exactly does the World-Wide Web have to offer education?

The Web provides an excellent medium on which to design on-line curricula.

The Web as Tutorial

The most basic element of using the Web as a pedagogical instrument is found in its ability to present information clearly, attractively and logically. One can use hypertext to organize enormous amounts of data in a relatively lucid fashion, using menus, key word searches, even clickable graphics as a means to link the user to more and more information.

The Web provides an excellent medium on which to design on-line curricula. For example, there already exists on the Web carefully annotated and cross-referenced hypertexts of the entire works of Shakespeare (http://the-tech.mit.edu/Shakespeare.html). With a little more work, this site could easily include question and answer sessions, as well as audio and video clips of each Shakespeare play and poem, thus transforming the works of Shakespeare into an interactive document that would be more than just useful and educational to students; it would also be fun.

The Web as Forum

Internet proponents have long touted computer networking as a forum for discussion and as a marketplace of ideas and information. By developing a Web site in conjunction with an e-mail discussion group (known as a listserv), designers can create a multimedia/hypermedia dialogue on any given subject. For example, a physics teacher may organize a Web site that includes all class lectures, frequently asked questions, and multimedia presentations of experiments using text, graphics, and audio. With the inclusion of a listserv, students may automatically e-mail information to that site in the form of additional questions, project reports, or essays. Class information can be organized and stored in the Web site, which would allow easy access. Students do not even need to become experts in HTML (though it certainly would be useful); an e-mail-to-HTML converter can take care of that for them, and thus allow the class to participate in a logged interactive dialogue.

The Web as Assessment Center

For some years now, teachers have used portfolio assessment, a form of assessment in which students collect their best work in a class and present it at the end of the semester for final grades. Portfolios offer a simple and fairly effective way of

The World-Wide Web, as it so happens, presents an excellent medium for students to organize and publish their own processfolios.

For the educational community, on-line hypermedia offers a simple way to design interactive lessons for local and distant use.

assessing students' work without the typical multiple choice, end of term tests. Howard Gardner (1994) takes this concept one step further and refines it into what he calls a processfolio. Unlike a portfolio, a processfolio includes every single creative step towards some particular goal. In the case of a major report, students include all comments and criticisms made by their colleagues and their teacher. In addition, students articulate a meta-assessment of their work-in-progress. In the end, processfolios demonstrate students' growth and understanding of a subject as well as their ability to give and take constructive criticism.

The World-Wide Web, as it so happens, presents an excellent medium for students to organize and publish their own processfolios. Creating hypertext links noting the progress of the project would be a simple matter once students have developed a basic grasp of hypertext markup (a skill that could be developed in a minimal amount of class hours). And because the nature of the Web allows documents to exist as in-progress texts (i.e., information can be formed and developed on-line), students can share their work as it grows and learn from the responses they receive from other Web users. The Web emphasizes the process aspect of the processfolio because the project is available for all to see and explore, 24 hours a day, instead of being viewed only once or twice a month during in-class project updates.

What Next for the Web?

Commercial developers have recently adopted the Web as their new pet cybermedium, from the *Star Trek: Generations* site to Time/Warner's *Entertainment Weekly On-Line*. Increasing the profitability of these ventures are planned inclusions of basic Web browsers in the operating systems for both Macintosh and Intel-based PCs, as well as America On-Line's plans to make the Web accessible over its commercial subscription services as early as February 1995.

The Web is accepted internationally because of its relative ease of use and cross-compatibility; future changes in HTML standards, especially in layout design and in the integration of live communication protocols, will inevitably make it even more powerful. For the educational community, on-line hypermedia offers a simple way to design interactive lessons for local and distant use. And as the World-Wide Web becomes more accessible to schools around the country, teachers and students alike will be able to explore cyberspace and design new resources for a multitude of purposes that have yet to be realized.

[Gardner, H. (1994). *Multiple intelligences: The theory in practice.* New York: Basic Books.]

[Editor's note: Andy Carvin discusses the use of Web sites and education on EdWeb, a Web site at http://k12.cnidr.org:90, and on WWWEDU, a listserv discussion at listserv@k12.cnidr.org. His e-mail address is acarvin@k12.cnidr.org]

Book Review

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The Universal Schoolhouse

James Moffett (1994) envisions schools giving way to "learning networks" distributed throughout the community, learning becoming holistic and student-centered, and curricula becoming individualized, with current educational structures such as subjects and courses, textbooks and examinations, credits and certificates yielding to self-directed and self-assessed learning activities. Education will be completely voluntary, although publicly supported and united with a wide range of social services.

Moffett belongs in the tradition of radical educational theorists including Maria Montessori, Rudolf Steiner, John Dewey, and Ivan Illich. Many of Moffett's proposals for community learning networks echo ideas set forth by Illich in *Deschooling Society* (1971). For Moffett, as for Illich, any curriculum selection, or enforcement of standards by social groups larger than the individual, frustrates the individual's innate desire to learn and leads to disempowerment of the learner. Moffett posits that solutions to a wide range of social problems (e.g., unwanted pregnancy, overpopulation, drug abuse, crime, ill health, selfishness, poverty, unemployment, debtor economics, deteriorating families, crumbling infrastructure, environmental pollution) depend upon the development of spiritual maturity in individuals. Schools, better suited for supporting collective rather than individual consciousness, have essentially become obsolete. Each community should form "a totally individualized, far-flung learning network giving people of all ages access to any learning resource at any time." (p. xvi)

Moffett specifies several change-drivers in the current situation that support practical implementation of his proposals. One of these is the depth of social problems such as those listed above. Traditional education is failing to prepare students to cope with interdisciplinary challenges such as AIDS, youth violence, and the greenhouse effect, so education will be forced to change as a matter of social survival.

With the accelerating development of interactive educational software and networkable multimedia curriculum packages, direct learner access to a vast range of instructional resources may be just over the horizon.

Another change-driver is technology. The growing availability of multimedia CD-ROM, Hypercard stacks, and the Internet makes decentralized learning activities more feasible now.

Other change-drivers are trends within education itself. Such current reform trends include: individualization, collaborative and cooperative learning, active learning, integrated learning, heterogeneous grouping, nongrading, nontracking, team teaching, peer tutoring, cross-age tutoring, paraprofessional aides, block scheduling, full-time use of schools, eliminating textbooks, replacing standardized tests by on-site assessment, merging adult education with regular schooling, apprenticing, mentoring, and community service.

Moffett sees teachers taking on new roles as tutors, coaches, and mentors. Students will learn through travel, community service, games, therapy, the arts, spiritual disciplines, and self-teaching. An especially powerful set of instructional techniques will derive from "rippling." Rippling, a form of cultural diffusion, is the "informal, continuous tutorial of some knowledge or skill that everybody is at once receiving from the more experienced and transmitting in turn to the less experienced" (p. 168). Moffett believes that the natural setting for rippling is in the community, among groups mixed heterogeneously by age and experience. Apprenticing and interning are familiar, formalized examples of rippling. In the community learning networks, learning will be life-long and continuous. Everyone will take turns acting as both teacher and learner.

According to Moffett, this emerging new system of education will lead to cultural transformation. Public services will be integrated with public education in a "master problem solving process." Enlightened individuals nurtured by the community learning networks will band together to create a better society, representing a breakthrough in the course of human evolution.

[Illich, I.(1971). *Deschooling society*. New York: Harper and Row; Moffett, J. (1994). *The universal schoolhouse: spiritual awakening through education*. San Francisco: Jossey-Bass.]

Implications

It is tempting to dismiss a number of Moffett's ideas as utopian. However, the change-drivers he describes are real, and although schools will probably not be eliminated, they may begin to take on characteristics suggested by Moffett's learning networks (e.g., multiage, year-round, individualized, project-based, service learning). His suggestion of a learning network that is available to the entire community at all times simply describes services already present on the Internet. Moffett's notion of instruction through rippling appears feasible if learners have access to e-mail, Listservs, Gopher, Veronica, Archie, Usenet News and the World Wide Web. With the accelerating development of interactive educational software and networkable multimedia curriculum packages, direct learner access to a vast range of instructional resources may be just over the horizon. Moffett's book helps us visualize emerging trends and form an outline of alternative educational futures.

TOOLS

Bernard Glassman
Pragmatix:Information Design

ClarisWorks 3.0 for Windows and Macintosh.

At last there is an integrated suite of applications that is small enough for most laptops, versatile enough for most office use, and fully interplatform-compatible between Windows and the Macintosh.

It's ClarisWorks 3.0. It was good on the Mac and only mediocre under Windows in its last version, but it's just about everything most of us need most of the time on both machines, now.

ClarisWorks 3.0. uses the convention of the "frame," a rectangular area that you draw and designate as a text area, a spreadsheet, a piece of "drawing paper" or a database screen layout. It's all there: a full set of drawing tools, great graphs that can be easily moved around your page, spreadsheets that can be frames in the middle of text, so that what might be a mere table in Word or WordPerfect is a highly function-filled, completely active array of values and connecting formulas. No need to get caught up in the RAM-hogging intricacies of DDE and OLE, or publish and subscribe.

The weakness, if you want to call it that, continues to be the terminal emulator. Under Windows, ClarisWorks has no built-in communications, but it can run another emulator seamlessly. The default is Windows Terminal, which must be Claris's way of pointing out just how bad a terminal program can be. You can make ClarisWorks run your favorite emulator; if you are a ProComm or Crosstalk fan, you can get to it from ClarisWorks and copy and paste text from the screen. I don't know what happens if you try to link to a TCP/IP client.

ClarisWorks comes with a better collection of clip art than any of the Microsoft products except for PowerPoint. You can put together a very attractive slide show with it.

You won't be making a mistake moving from your current spreadsheet and word processor and database into this luxurious suite.

As for interplatform compatibility, I couldn't find a file that I could create on the Mac and not run on the PC, or create under Windows and not transport to the Mac. I'd suggest you stick with TrueType fonts, though. They transport more easily.

ClarisWorks comes with a heck of a database, one you will find yourself using for a lot more than your professional contacts, the production of form letters, or the management of student grades. Even without it, ClarisWorks would beat Microsoft Works without a contest. But the database continues to offer a distillation of the finest features of FileMaker Pro, and some they haven't even gotten around to yet. You'll miss the strength of FMPro's scripting only if you have gotten used to it. But ClarisWorks has a macro facility, that, while not editable, is reliable.

For a planner, the database is an excellent repository of abstracts, with a resourceful text search capability. You can search for every article, produce a set of citations, turn it into a full document, using a consistent set of menus and commands. The find capability is reasonably flexible, but not fancy. Don't expect SQL. But you'll design reports with ease.

One other weakness: Claris packages something called Assistants with ClarisWorks. They are really nothing more than a few templates for the most common documents. But they don't compare with Microsoft's wizards, and it's time someone else did come out with something that competes with that excellent innovation.

Nonetheless, you won't be making a mistake moving from your current spreadsheet and word processor and database into this luxurious suite.

The Fifth Global Change Strategic Management Seminar for Educational Leaders
Sponsored by *On the Horizon*, 27-31 July 1995, University of Saint Andrews, Scotland

Call for Briefing Papers

This is a call for briefing papers to be presented at the Strategic Management Seminar. Papers should address either of two topics: (1) Challenges of Global Change or (2) Planning Systems Designed to Meet the Challenges of Global Changes. Each briefing paper should be 5-10 pages, single-spaced. To submit a briefing paper, send a one-page abstract no later than 30 April 1995 to James L. Morrison at the *On the Horizon* office. The deadline for submission of the full text paper is 30 June 1995.

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On the Horizon

the environmental scanning newsletter for leaders in education

April/May 1995 • Volume 3 Number 4

Human Factors: The Problems of Integrating People and Technology in the Workplace

Arnold Brown
Weiner, Edrich, Brown, Inc.

The massive introduction of workplace technology has already resulted in significant changes in organizational structures and relationships.

The extraordinary—perhaps even revolutionary—development of new workplace technologies has generated reactions ranging from wild-eyed optimism to a revived Luddism. The optimistic champions of technology predict a new Golden Age, with machines liberating people from drudgery and danger. The neo-Luddites (whose attitude can perhaps best be summed up by the late I. F. Stone's wry remark after trying to learn how to use a word processor: "The only thing God didn't do to Job was give him a computer!") envision dire economic and social consequences for people.

With such extremes of reactions to the machines and their possible impacts, it must be obvious that greater attention should be paid to the interaction of people and technology—and, more specifically, *how to improve* that interaction. It must be remembered that the major, if not the only, purpose of workplace technology is to enhance human productivity. This purpose is undermined by the growing problem of *human factors*—the gap between human and machine capabilities.

The massive introduction of workplace technology has already resulted in significant changes in organizational structures and relationships. It is unreasonable to assume that such significant changes can be made without a high degree of individual and organizational trauma. The purpose of studying human factors is to minimize these traumas and to maximize the return from the enormous investment in technology.

Economist Stephen Roach of Morgan Stanley says that new technology now accounts for more than one-third of all capital equipment outlays, and the ratio of high-tech capital per worker has more than doubled in the last 10 years. The presumption that such high-tech investment guarantees a productivity payback he says, "is a luxury the economy can no longer afford."

Among the reasons cited most often for the discrepancy between productivity growth and investment in technology are that:

- many managers and workers lack the knowledge and training to use workplace technology effectively, and
- supervisors lack appropriate techniques for managing the interaction of people and machines.

Generally unstated but implicit in all analyses is the belief that the human factors gap is bridgeable through orthodox management techniques—education and training, for example. Is this belief warranted?

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New technologies have a profound effect on our biologically and culturally ingrained perceptions of time and space.

As technological advances continue—and even speed up—it is likely that more and more people with hard-earned skills of the moment will become marginally useful as new skills replace them.

Human Factors

Perhaps above all, the new technologies are disorienting. They have a profound effect on our biologically and culturally ingrained perceptions of time and space. Advances in communications technology now mean that *everything* happens instantaneously *everywhere*. Distance has vanished. Traditional rhythms of day and night, work and leisure, become increasingly irrelevant as the new technologies make possible—indeed, require—the 24-hour day and the seven-day week. Beepers, modems, cellular phones, PCs—these and other developments mean that one will always be linked closely to the job, unobstructed by time or space.

The effects of the disorientation these changes cause are seen in many ways. Most striking is the growing perception by more and more people that they have less time than before. In fact, some studies show that people actually have *more* time. The apparent contradictions show the befuddlement created largely by the impacts of new technologies on people's *sense* of time and place.

There is, in addition, a phenomenon we call "The Frankenstein Syndrome"—a deep and pervasive fear of the consequences of unrestrained scientific and technological development. While the two most prominent sources of this fear are nuclear and genetic technologies, information and communications technologies are significant contributors as well. To many people they represent cause for economic concern—job displacement, in particular. They also arouse concern about encroachment on individual autonomy—invasion of privacy, for example, and monitoring of work.

Public expressions of concern and anger over the inadequacies of our education system are widespread. We have all read and heard enough about illiteracy. But one aspect of concern about education that has not received a great deal of attention—one that may be even more important long term to business management—is *aliteracy*.

Aliteracy—illiteracy among the literate—was the theme of Professor Allan Bloom's best seller, *The Closing of the American Mind*. Bloom blamed higher education for turning out young people who are unable to think or make judgments. Perhaps even more insidiously, the rapid advance of technology is making more and more educated people less able to understand their world. Harvard physics professor Gerald Holton foresees a society split between a small technological elite and a vast majority unable to understand enough of science and technology to make decisions about their own governance.

A parallel factor is *accelerated obsolescence*. As more and more information is generated, specialists and technicians find that the information they possess becomes more quickly outdated. The more specific and technical their knowledge is, the more likely it is that they will have to unlearn in order to learn again in the future. Unfortunately, human memory, unlike computer memory, is not that easily erased. Consequently, more and more people will find that what they know will interfere with their learning what they need to know.

Several years ago, a data processing (DP) subsidiary of one very large corporation discovered that its strategy of paying top dollars to hire the best DP graduates from the elite universities had backfired. When the company began using a fourth generation computer language, their well-paid COBOL people were unable to switch to it. They had been leap-frogged by a technological advance. The company had to hire new programmers for the more advanced work, leaving the lower level work to the COBOL programmers, who were now the equivalent of clerks.

As technological advances continue—and even speed up—it is likely that more and more people with hard-earned skills of the moment will become marginally useful as new skills replace them.

Compounding the problem are the inadequacies of corporate training. In most companies, training gets short shrift; indeed, at least 80% of computer users in American companies say they have received no, slight, or moderate training from their employers.

More Technological Advances

As wide as the human factors gap is now, it will get wider. To put it plainly, technology is developing faster than people are. The rule of thumb in the computer business is that the capacity of chips doubles every 18 months. Supercomputers are expected to become more common and more accessible in terms of cost. Scientists are now developing computers that can learn using neural network techniques.

These advances generate corresponding risks. For example, some analysts believe that the stock market's steep fall on "Black Monday," October 19, 1987, was at least partially due to the amplifying effect of the vast computerized system the market now depends on. In unsettled or volatile times, the system becomes destabilizing rather than stabilizing as decisions are automatically made even though their base of assumptions is increasingly false. According to a number of scientists, it is possible that all such large systems are governed by the mathematical theory of chaos. This means they may be inherently unpredictable, subject to unanticipated and unexplainable wide swings in behavior.

Continued on page 5

From the Editor

James L. Morrison
Program in Educational Leadership
The University of North Carolina at Chapel Hill

On the Horizon, Horizon List, Horizon Home Page: A Forerunner of Education in the 21st Century

A few weeks ago we responded to an invitation by the National Information Infrastructure Awards Committee to participate in a competition for an award designed to demonstrate the capability, utility, and potential of the "information highway" in encouraging communication, collaboration and access to information beyond traditional boundaries. Respondents were requested to document how they were using the information highway (i.e., Internet) and how they were encouraging its use.

In preparing our response, it became clear that the evolution of our service to include a listserv and a World Wide Web (WWW) home page (our Web site) provides an example of how educational programming may well occur in the coming decade.

Let me explain. *Horizon Home Page* is an easily accessible site containing past issues of *On the Horizon*, a futures planning database of abstracts, "gems" from the Internet containing discussion strings by participants on emerging trends and issues that may affect education, as well as "good stuff" from avant-garde articles in non-mainstream publications. Anyone with access to the Internet

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On the Horizon focuses on potential developments and critical trends affecting education. It is published in October/November, December/January, February/March, April/May, and June/July by the Institute for Academic and Professional Leadership, School of Education, The University of North Carolina at Chapel Hill. ISSN 1074-8121. Annual cost: individual, $24.50; organizational, $49.50; site license, $124.50. For more information, contact Professor James L. Morrison, Editor, *On the Horizon*, or Assistants to the Editor, Jonathan Barker, Adam Bianchi, K.C. Brown, Sharon Moore, Robbi Pickeral, or Clari Terrill, CB# 3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599. (919) 962-2517. Internet: Morrison@unc.edu.

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Combining the WWW site with an Internet list demonstrates how schools and colleges can use this technology for their educational programming.

We intend to host regular, real-time chat sessions and conferences between leading futurists and educators on the Web site. Please join us, and preview what you and your faculty colleagues will be doing in classrooms in the 21st century.

can easily browse these materials and contribute to them. Moreover, we use *Horizon List* to post draft *On the Horizon* articles for review, critique and comment by *Horizon List* participants; many of these responses are then posted in the WWW pages, thereby enabling browsers to benefit from not only the articles, but also from the comments generated by the articles. In addition, WWW browsers are encouraged to add their own comments to articles and to contribute to the futures planning database. Since *Horizon List* participants and *Horizon Home Page* browsers are spread around the globe, the comments we receive enrich articles and discussions.

Combining the WWW site with an Internet list demonstrates how schools and colleges can use this technology for their educational programming. As Andy Carvin (1995) pointed out in the February/March issue of *On the Horizon*, any school or department could post curricular materials and student papers/projects on a Web site, which could be used/critiqued/revised by students and teachers via Internet e-mail on a listserv, just as we do in producing articles for the newsletter. Curricular programs on a Web site could include not only graphics and text (which is what we have), but also audio and video (which we do not currently have). Within a few months it will be possible to insert text on the Web through improved HTML translators as easily as it is to insert text in different word processing applications. Such technology lends itself to constructionist, active-learning activities, activities that capture the imagination and creativity of students, thereby enhancing the learning process.

In the coming months in the *Horizon Home Page*, we intend to host regular, real-time chat sessions and conferences between leading futurists and educators on the Web site. Please join us, and preview what you and your faculty colleagues will be doing in classrooms in the 21st century.

[Carvin, A. (1995). The world wide web: The killer application for education? *On the Horizon, 3* (3), 13-14.]

Accessing *Horizon List* and *Horizon Home Page*

If you have access to the Internet, you have access to *Horizon List* and *Horizon Home Page*. To become a participant on *Horizon List*, send the following message to listserv@unc.edu

subscribe horizon <yourfirstname> <yourlastname>

To access *Horizon Home Page*, if you have a graphics-supporting browser (e.g., Netscape, Mosiac), point it to the following URL:

http://sunsite.unc.edu/horizon

If you do not have such a browser (e.g., you use a modem to dial into your host site), and you do not have access to a SLIP or equivalent connection, you can browse the text of *Horizon Home Page* as follows:

When you log on your e-mail server, at the UNIX prompt (%), type:

telnet sunsite.unc.edu

Hit return. You will get another UNIX prompt. Type:

lynx

Hit return. You will then be asked for your terminal emulation, which should be set to vt100. Type:

vt100

Hit return. You are now in the SunSITE index. Use your down arrow to get to *On the Horizon*. Use the right arrow to enter *Horizon Home Page*.

The directions for navigation within the home page are at the bottom of your screen. You are now in our Web site; browse to your heart's content.

Call for Manuscripts

for *On the Horizon* and a special issue of *The High School Journal*

On the Horizon articles take two forms: *abstracts* of one or more articles/books/Internet postings that have implications for education, or *essays* on emerging trends or developments that may affect the future of education. A unique feature of abstracts or essays in *On the Horizon* is that authors speculate on the specific implications of "signals of change" in the macroenvironment for educational leaders. Abstracts and essays are brief (800-1,000 words); our readers are busy people who want get to the bottom line quickly. Send manuscripts to James L. Morrison.

A special issue of *The High School Journal* on *The Future of Secondary Education* (October/November 1995) will consist of 10-12 articles of 3,500-5,000 words each. Send a thesis paragraph and brief outline to James L. Morrison by 1 May 1995.

James L. Morrison, Editor, *On the Horizon*, CB 3500 Peabody Hall, UNC-Chapel Hill, Chapel Hill, NC 27599. E-mail: morrison@unc.edu.

Information technology will ruin our lives unless we come up with some radical solutions.

Managers cannot effectively make decisions without first transforming information into intelligence.

What may be an instinctive fear of technology develops into the newest occupational illness, *techno-stress.*

continued from page 2

Another irony is that the unprecedented volume and speed of activity on Black Monday was possible only because of the existence of the computer. Twenty years earlier, the market would have become too clogged at only a fraction of that volume. Some observers have also pointed out that reliance on program trading removed from the market what was most needed in a crisis situation—human judgment.

Information Technology

Food companies used to get their market reports monthly. In the month-long interval between reports, marketing people could analyze the data and develop the most appropriate tactics to improve or maintain distribution patterns and market share. When technology enabled them to see the reports weekly and finally daily, they found that there wasn't enough time to process the information properly. This was exacerbated by restructuring and downsizing, creating a situation where fewer people had to do much more.

The key point here is not that there was an increase in information, but that the time factor changed. As a consequence, the information became less manageable.

Author Stan Lee coined the phrase *negative information*, which he defined as information that causes recipients to know less than they did before. "It subtracts from one's store of knowledge and wisdom," he wrote. "The more negative information one is exposed to, the less one knows."

In the case of the food companies, what had been valuable marketing information became negative information because new systems were installed without taking into account human factors.

Datamation magazine reports that the amount of information electronic engineers have to learn is already too much and is increasing at an accelerating pace. If even the most conservative estimates of the increases in information by the year 2000 are correct, it will be humanly impossible to learn it all.

We have learned in recent years that of the vast amount of data gathered by NASA in space exploration in the last two and a half decades, only 10% has been studied by scientists. And only 1% has been analyzed closely. The problem is expected to worsen. When NASA's earth science satellites are all in place (perhaps by 2005), they will send down one terabyte of information daily. That is more earth science information in one day than has been gathered in all past earth science research.

The distinguished philosopher Daniel Dennett goes so far as to say that information technology will ruin our lives unless we come up with some radical solutions. As he points out, technology has multiplied the availability of information, a corollary of which is an increase in the responsibility for *knowing* the information—and the liability for not knowing it. There is, as he says, an obligation to know, and that clashes with the human limits on the ability to know. "We drown in the available information," he writes, "unable to make decisions."

Over the last decade, we were told over and over again that we were in the midst of an information revolution. But true revolution requires more than just technology. It requires a corresponding improvement in the ability of people to match the capabilities of the technology, and that has not come about.

What has happened? People have accommodated to the increases in the flow and magnitude of information. One such accommodation is what has been called *nuggetizing*—people boil down the vast amount of information to concepts or statements that can be easily grasped and absorbed. Thus, information is packaged; the more easily accessible the package the better. The result is a kind of brittle world in which all room for doubt, debate, speculation and analysis is displaced by simple statement nuggets.

This has powerful negative impacts on decision-making. Managers fearful of being held accountable will practice defensive management, just as doctors afraid of malpractice suits will practice defensive medicine. Growing concern about data security contributes to the institutional sclerosis by encouraging a desire to hoard rather than distribute information.

The fact is, information (or data) is a raw material. Like iron, it must be transformed into something else before it can be used. Just as an automobile manufacturer cannot make a car without first changing iron to steel, managers cannot effectively make decisions without first transforming information into intelligence. The technology we now have is, in the main, information technology, not intelligence technology. Improvements in the technology, again, are largely in its ability to gather, store and catalog information.

The *cri de coeur* from managers is "give us what we need to do our jobs better." Instead, they are inundated with data, and as a consequence they dawdle or delay, or they make decisions that they themselves are increasingly dubious about. Morale plummets, and what may be an instinctive fear of technology develops into the newest occupational illness, *techno-stress.*

The relentless advance of technological development puts even highly educated people at risk of becoming to some extent functionally illiterate.

The overwhelming problem with technology is that it enables us to gather far more information than we as humans are capable of processing, causing an *information overload*. But that term may be misleading, because it implies that what we need is less information. What we really need, however, is *better* information—that is, information that is both more useful and more usable. The revolution needs to pause for people—to allow the human factor to regain control and focus.

Implications

George Kuper, head of the Manufacturing Studies Board of the National Academy of Sciences, says that managers must face up to the "social revolution" required to integrate technology effectively into the workplace. A new kind of socio-technical planning is needed to rearrange the way work is organized and managed so as to achieve a functioning and productive synthesis of people and technology in the workplace.

There is a revolution now happening in the workplace. CEOs can disintermediate the various levels of management between them and raw data, thereby rendering middle managers superfluous—and even some senior managers. When secretaries and clerical workers are more adept at using machines than are their bosses, control passes to underlings, further exacerbating the fears and insecurities of managers. People and machines can be complementary. Merging them requires recognizing and accommodating human factors.

Many managers speak openly and frequently of their disappointment with technology. In living up to its potential, technology has exceeded human capacities to harness it.

The gist of their complaints is that the technology has not lived up to its potential. But that is not the problem. The technology has lived up to its potential; indeed, it has exceeded expectations. The real problem is that we did not anticipate, and still do not fully appreciate, human factors.

In the management of organizations there is not yet a satisfactory substitute for human intelligence. It is necessary to examine what technology can do to provide support for that crucial element—or how it might interfere. Only then can we make the appropriate purchase and proper use of technology.

Gerald Holton warns that the relentless advance of technological development puts even highly educated people at risk of becoming to some extent functionally illiterate. Holton calls this a "diminution of national possibility." Organizationally, it can mean management that is either impotent or increasingly irrational.

We may have lost the current generation of managers, struggling to catch-up and hold on to their rung on the management ladder. The central role for higher education is to make available both the understanding and the resources that will better equip the *next* generation of managers to deal effectively with the merging of technological and human factors.

SOCIAL

Lois Graff
School of Business and Public Management
The George Washington University

Are Private Schools the Answer?

In an op-ed article in a recent *Washington Post*, Milton Friedman argues that the school system is much worse today than it was 30 years ago and places part of the blame for that at the feet of growing centralization and increased strength of teachers' unions. According to Friedman, centralization has created large private fiefdoms run by administrators and union officials, and this hampers the "radical reconstruction" required by the school systems.

The political and technological revolutions of the past few decades have opened the doors to global competition and opportunity for many people around the world. These twin revolutions have placed a premium on education and widened the wage differential between the educated and the uneducated, something Friedman considers a "recipe for social disaster." These trends make the overhaul of the educational system in the United States ever more urgent, as it is the only force capable of offsetting the trend toward stratification.

The way to accomplish this overhaul, says Friedman, is through privatization supported by a voucher system, letting the marketplace create the kind of creative, responsive school systems that we need.

[Friedman, M. (1995, February 19). Public schools: Make them private. *The Washington Post*, C7.]

Implications

The first question to ask is whether we need a radical restructuring. Schools are already in serious trouble, and technology is ultimately going to have a profound effect on education. The changes in the past few years alone and the phenomenal growth in the use of the Internet indicate the need for change. Corporate America, with greater funds and greater freedom, but certainly no greater stake, continues to experiment with re-creating

Corporate America continues to experiment with re-creating and re-engineering. Can educators afford to do less?

and re-engineering. Can educators afford to do less?

Is privatization the way to achieve radical restructuring? Private organizations not subject to the same degree of regulation can be more selective in their student body and have incentive to be more creative in order to capture a competitive share of the market.

The public system has provided education for children who cannot be educated in the standard classroom, at the public's expense. The public system has provided education for children with learning disabilities or physical disabilities even though educating them has been a special challenge and certainly not an economical venture. The public system has accepted and educated hard-to-handle children when the private schools expelled them.

Also, the public school system has a mission to be a strong force in creating and sustaining the "melting pot" and in intervening to ensure diversity and equal access. Privatization might result in special schools for special populations leading to increased stratification along ethnic and/or religious and/or economic lines.

Education for all is mandated; educators must caution citizens not to move too quickly. Change we must, certainly technologically, but we must engage in a thoughtful discussion of the issues involved in privatization before making that decision via the ballot box. The American democratic system may be hanging in the balance.

TECHNOLOGICAL

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Dark Leadership?

Education executives will not be excused for long if they do not develop a plan to navigate the transition from today's teaching infrastructure to tomorrow's learning infrastructure.

Network cognoscenti often speak of "dark fiber" when referring to fiber-optic cabling that has not been lit up with the digital electronics necessary to transmit data. Is education suffering from "dark leadership?" Do executive leaders in education understand the educational and social implications of rapidly changing, increasingly affordable digital networking and multimedia technologies? Do they view information technology negatively as an additional cost or strategically as a tool to enable the educational change expected by the public?

Education executives are busy and cannot be expected to track rapid changes in technology, but they will not be excused for long if they do not develop a plan to navigate the transition from today's teaching infrastructure to tomorrow's learning infrastructure. We should expect education executives to understand that information technology is the most viable vehicle available for navigating the transition. It is a tool for addressing issues of educational quality, educational access, and instructional costs.

The public and the body politic at all levels are worried about the spiraling price of education and the value it delivers. The heft of education's costs lies in instructional programs, mostly in instructional personnel. Attempts to optimize the productivity of instructional investments within today's labor-intensive contact-hour paradigm are likely to abridge quality by increasing class sizes. Not even distance education can resolve the quality/quantity trade-off as long as the Carnegie Unit is tightly linked to the contact hour, although it can increase access to education while requiring less capital investment than new bricks and mortar. The contact-hour model delivered from any distance is labor intensive.

A primary goal of teacher/student contact should be to guide the student in a way that inspires exploratory self-study. The new technologies can mitigate some of the constraints of time, place, and scheduling that hamper this ideal mentor/apprentice relationship. But overlaying technology on the contact-hour model of instruction is costly. We must utilize the flexibilities inherent in technology to discover models of instruction appropriate to the emerging knowledge economy.

We must understand the differences between computer networks and video networks if we are to experiment usefully on the future of instruction in the context of the growing demand for accountability. The primary difference between computer networking and video networking is not video itself. After all, we can capture, store, and retrieve video in digital form across computer networks—"video on demand." The critical difference is that a real-time video network, as typically deployed for distance education, is time-dependent, with interconnections mediated by humans. The resources for a telecast or teleconference are scarce and must be negotiated and scheduled, and the time-dependent interconnections among the participating sites must be managed by a technician. In contrast, a student at a computer connected to the Internet can access any available resources on the Internet any time, and this access is mediated by computers without additional human intervention. Computer networks scale much more readily than do (real-time) video networks. This expensive difference between computer and video networks will persist even after today's analog video technologies are replaced by digital technologies in a few short years.

We must learn how to create a distributed learning environment combining the best features of traditional instructional models, whether class-

The future of schools is at stake as we reflect on the implications of information technology for the schools of the future.

room-based or real-time video-based, with the new asynchronous opportunities for sharing and communicating enabled by educational networks and their connections to the Internet. "Distributed learning environment" implies a shared responsibility for student learning among many different institutions. No one school has the resources to create a distributed learning environment solely for its students. Resources will have to be pooled and new funding and accounting models created if today's school-centered model of education is to shift toward a society-centered model. We must work together to provide "learning on demand" while retaining valuable local distinctions among educational organizations.

There is little risk in trying to find shared technology-enabled solutions to important national educational problems, such as students' weak command of basic mathematical skills. This weakness erects barriers to further study in many other quantitative fields and depresses retention and graduation rates. This is but one example of a national educational problem in which collective executive leadership would be welcomed by the associated content experts even if the executive leadership insisted on the economic viability (productivity) of the solution.

Information technology provides new leverage for education's most important asset: its intellectual capital. We must learn how the new technologies can enhance the social contract between learner, mentor, and school. How can the bond between a teacher and a student be strengthened while utilizing the disintermediating potential of information technologies to increase instructional productivity? What are the key civilizing factors in the classroom experience? How can we apply technology productively to the acquisition of specific content while strengthening the socialization that requires student/teacher and student/student contact? Which students need to be at school, to what extent, and when? Which aspects of learning can best be mediated directly by the teacher and which can be mediated indirectly by interactive technologies?

The focus of the transition from a school-centered teaching infrastructure to a national learning infrastructure is shifting away from the electronic medium itself and onto its mind-boggling capacity to amplify the human experience—the message. Quality education and quality entertainment share one characteristic. Both should be engaging. Only education executives can identify the fiscal and human resources needed to support a national information infrastructure that serves national educational goals as well as it serves the commercial quest for compelling entertainment. Although external support can seed innovation and change, it typically is conditioned by a requirement that the school assume any and all attendant long-term support. We cannot count on external support for on-going instructional programs.

It will be essential to plan and manage the future in ways that secure investments in information technology and optimize them to the benefit of the collective educational mission. It will not suffice to view information technology as a budgetary black hole to be fed periodically to the benefit of the technological cognoscenti. Navigating the traditionally slow moving waters of educational change in the face of the societal wave of expectations surrounding the evolving national information infrastructure, and in my state the opening of the North Carolina Information Highway, will require deft leadership empowered by knowledgeable and supportive governing bodies.

The future of our schools is at stake as we reflect on the implications of information technology for the schools of the future.

ECONOMIC

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The New International Financial (Dis)Order

Contemplating the 1995 dollar problem takes the seasoned traveler back in time to 1972. European countries saw the U.S. engagement in the Viet Nam war as a signal for the dollar's collapse, and regardless of our allies' efforts to help, eventually President Richard Nixon had to close the "gold window," the Gold Standard. The dollar became just another currency.

A period of fluctuation followed. The dollar was up. The dollar was down. The experts said the dollar should be even lower. Business people started pressuring President Ronald Reagan to "lower the dollar." "How can we export with such a high dollar?" In August 1984 the Group of Seven met at the Plaza Hotel in New York and decided to lower the dollar. Since then, the dollar has continued to slide more and more every day.

Eleven years later, we seem still to be reeling from that decision to lower the dollar. But why? Why is it that a country with the best economic fundamentals (growth in its GDP, low inflation, rising exports, favorable interest-rate differentials, first in global competitiveness) must beg its friends to help support its currency? If a weak dollar was in our national interest in 1984, why does the U.S. treasury secretary, Mr. Robert Rubin, broadcast to the world that "a strong dollar is in our national interest"?

We are directly responsive to the ebbs and flows of the international investments of our trading partners, and at present, these have not balanced out in our favor.

While in the past, "wise" treasury men around the world made the decisions of when and when not to intervene, today traders can literally upset the entire course of international transactions through the manipulation of derivatives.

Why does the dollar have this plight? Some say it is caused by the shifting of the supply and demand curves. Americans demand too many DM and Yen while the Germans and the Japanese demand too few dollars. Why do these supply and demand curves shift the way they do?

Carnegie-Mellon University's political economist Allan H. Meltzer, a respected monetarist, says that "the dollar's weakness is concentrated against the Japanese yen and the German mark. Weighted against all the U.S.'s trading partners, the dollar has been roughly stable since 1988. Recently it has been strengthening against the U.S.'s two largest trading partners, Canada and Mexico" (Banks, 1995, p. 39).

As with all exchanges, the price one partner is willing to pay is closely related to his or her strengths and weakness and to the other partner's strengths and weaknesses. Since 1990, the U.S. has experienced a healthy growth in its economic activity. Growth means more jobs, more paychecks, more consumption and more imports. At the same time, the sliding dollar made U.S. goods cheaper overseas. So more exports meant more imports and more demand for dollars. This situation did not cause a decline in the balance of the trade deficit, however, because the increase in the value of exports was not enough to offset the increase in the value of imports. The U.S. was importing more and was paying more.

Meanwhile, the Japanese were experiencing low growth rates, which put tremendous pressure on the government to create jobs. So they too started funneling money to the domestic market, siphoning it off from the international market, resulting in an increase in the supply of dollars that led to a decline of its price. We are, in other words, directly responsive to the ebbs and flows of the international investments of our trading partners, and at present, these have not balanced out in our favor.

Another totally unanticipated blow to our economy comes from the investment phenomenon known as *derivatives*. In the world of modern technology, on any given day, some one trillion dollars are exchanged in derivatives trading. While in the past, "wise" treasury men around the world made the decisions of when and when not to intervene, today traders can literally upset the entire course of international transactions through the manipulation of derivatives. Originally, the variables underlying derivative securities were usually stock prices, stock indices, interest rates, exchange rates and commodity prices. Today, they are based on trivialities too insulting to contemplate or mention on these pages.

There is no answer as to how these economic problems are going to be resolved—not only for the United States, but in fact, for the world. All of the foregoing seems to be delivering the same message to all the investors: be super-alert, super-cautious, super-wise. And perhaps most important, be super-tuned in.

[Banks, H. (1995, March 27). Greenspan and Greenbacks. *Forbes,* 39.]

Implications

On a personal level, we must guard against possible mismanagement of pension funds and ask for explanations of new or suspect investments. Orange County, California, residents realized too late the wisdom of the old saying: If something sounds too good to be true, it most likely is. In fact, that's good advice for all of us. In the keystroke era of investment, many non-Orange County residents may also find their money tied in to that disaster.

Dollars up, dollars down, and international balances of trade may not turn-on our students. Theories and historic overviews tend to become boring. But as educators, we should find the explosive quality of keystrokes a remarkable tool to excite and involve students. The power of the keystroke may never again be so well illustrated to young and eager entrants to the world of global economy. We believe that is one, and perhaps the only, positive phase of the derivative phenomenon.

ENVIRONMENTAL

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The Nature of Nature and of the Environment

A distinction between "environment" and "nature" that may seem like hair-splitting can have important implications for environmental education. Nature is much larger than the environment. Not only does it include all the "things" in the world, it may also include something like their essence or their basic character.

To be part of human beings' environment, however, nature must affect our development (such as our health). Traditionally, environmental studies have not required studying the basic character of things in the world, unless that character were in some way responsible for the ability of nature to affect the development of organisms.

Why is the distinction important?

As environmental science and environmental studies programs spring up at all levels of education, the natural first question is "*what shall we teach*"? If this is answered by an environmental scientist, the focus will be on how the world is put

Making the distinction between nature and environment is sorely needed in education.

together (*what are the parts of the environment?*), the laws that control relationships between these parts (*how do the parts interact to cause material and energy to flow through the environment?*), and the role of the environment in affecting the development of organisms (*in what way is this flow of material and energy part of an organism's environment?*). Since human society is part of this flow of material and energy in the larger world, the study of society might also be included as part of environmental science, at least in the form of something like human ecology or industrial metabolism (National Academy of Engineering, 1994).

Environmental studies programs are based on a broader interpretation of environmental issues and of the role of human society in those issues. The answer to the question "*what shall we teach?*" is likely to be: "*whatever is needed to understand how environmental problems arise and how we are to respond to them.*" This understanding includes the motives behind the actions we take as humans, which in turn affects the way humans interact with the larger environment. To understand our role in environmental problems, we must understand our own minds.

So where does the study of nature fit into this?

Neil Evernden (1992) argues that the idea of nature has gone through historical change. Before the Renaissance (1300-1600), "nature" was everything outside of humans. To study nature was to study the makeup of the world and the laws controlling that world (see Peter Bowler, 1992). This sounds quite a bit like what we would call environmental science today, although without the additional requirement that nature must affect human development.

With the late Middle Ages (c. 14th century) came a shift in the idea of nature. Nature became involved with human goals and values; humans began to value nature as an "essence" to be respected and protected. Its essence became a source of inspiration in life. Why protect a forest? Because it is wilderness; a life spent conforming to the essence of wilderness is a virtuous life. From this perspective, studying nature helps us to understand how our personal values and choices in life should be formed. This is very different from thinking of nature as simply a set of "things" controlled by physical laws. Now, environmental studies may indeed rethink its focus, and broaden its scope to include nature in all its complex definitions.

[Bowler, P. (1992). *The Norton history of the environmental sciences*. News York: W. W. Norton & Co.; Evernden, N. (1992). *The social creation of nature*. Baltimore: The Johns Hopkins University Press; National Academy of Engineering. (1994). The *greening of industrial ecosystems*. Washington, D.C.: National Academy Press.]

Implications

Making the distinction between nature and environment is sorely needed in education. Nature has many subtly different meanings. Living as we do after the Renaissance, we must acknowledge that nature now includes aspects of the world closer to the realm of the humanities, even if environment does not. The idea of nature is emotionally charged, and this emotional relationship must be factored into environmental studies. In the present area, we have an additional layer with which to cope—the effect of technological advances upon nature and the environment. Environmental studies with a view towards both the environment and nature is of the utmost importance and may help guide the course of human development.

POLITICAL

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Rethinking Government

Peter Drucker, writing in *The Atlantic Monthly*, argues that the U.S. government is out of date. He posits that no president and neither political party is responsible for the disarray; the government has simply outgrown the structure, the policies and the rules that were designed for it. He believes that current efforts to reform existing programs and policies are misdirected. Something different, he argues, is necessary.

The strategy currently in vogue for government—budget slashing—is doomed to failure. Drucker cites the examples of IBM, Sears, and General Motors, which painfully learned that letting staff go and undertaking reorganizations proved not be the cure-all that they had hoped. Using a medical metaphor, Drucker notes that amputation before diagnosis is almost always a casualty. Organizations that have maintained their success during the turbulence of recent years started out by identifying their most productive components and setting out a plan to strengthen, promote and expand these components. A similar approach should be taken by government, Drucker argues. "Every agency, every policy, every activity,

The movement toward the removal of national rules to favor local controls may prove disastrous.

Growing societal fragmentation and the communications technology blitz have made it possible for the best organized and best financed interest groups to simulate a national mandate in support of their narrow interests.

should be confronted with these questions: "What is your mission?" "Is it still the right mission?" "Is it still worth doing?" "If we were not already doing this, would we now go into it?"

Drucker advocates a policy of governmental rethinking. Asking appropriate questions across our government would help us rethink first whether there is any need for such agencies as veterans hospitals, when there is no shortage of space in better equipped and better staffed hospitals in most locations, or a Department of Agriculture, which was very important during our *agrarian period*. Drucker says if the peace-time military aid we are supplying and bankrolling for nations under no external threat has outlived its need, the program should be abandoned. Similar treatment should be accorded to programs that have not been able to accomplish their goals, like the War on Drugs, which has failed to curb illegal drug use and has resulted in increased street crime, as enforcement efforts drive up the price of the drugs.

Rethinking also needs to diagnose the extent to which programs begun years ago can be altered to meet current challenges (welfare, for example). Rethinking may involve experimentation. Thus, in health care, we might pilot managed competition in one state and a single-payer approach in another.

How we rethink government is also an issue. Robert Wright, in a recent *Time* cover story, discusses the application of electronic technologies to the political process. "Electronic democracy" has taken hold to such an extent that whatever the issue of the day, the public (particularly the specially interested segments) jams the phone lines with faxes, calls, and e-mail to their elected representatives.

It is debatable whether such input is truly representative. Wright cites the tremendous influence that special interests have gained via electronics. He notes, for example, that AARP sends out 50 million pieces of mail per year; Congress, though aware of the pre-planned pressure-scenario, does not ignore what it hears from AARP's senior citizens. A mind-boggling example is also provided by the lobbying group of Bonner and Associates, which, according to Wright, can orchestrate the delivery of 10,000 faxes per night for its clients. Organized by congressional district, its databases of supporters of the causes that it is paid to advocate permit the firm to quickly mobilize hundreds of phone calls to Congress on any issue, where they may provide a swing vote. Radio talk show hosts also have huge sway over their listeners and are not shy when it comes to suggesting positions for listeners to advocate.

Organized electronic response instantaneously pressures elected leaders into going the way of the most noise. Our Republic was designed in a balanced fashion, so that members of the House of Representatives would be in tune with the current wishes of the people (by virtue of receiving their authority from biennial elections held on a district basis), and so that senators (elected every 6 years) would take a broader and longer-term view.

Syndicated columnist David Broder joins Wright in being wary of the electronic democracy trend. Where once political parties served broad-based coalitions of diverse groups, "that mobilization has fallen into the hands of private interests, pursuing very specific and narrow agendas." Agendas of these private, well-financed interests, Broder believes, "aim at payments to the poor who are the most vulnerable items in the government budget, while tax cuts for the wealthy command [their] support." Further, Broder laments that too many bombard the public and those in elective office with half-truths, untruths, and baseless allegations.

[Broder, D. (1995, January 25). Electronic democracy imperils just government. *Newark Star Ledger*, p 18; Drucker, P. (1995, February). Really reinventing government, *The Atlantic Monthly, 275* (2), 49-61; Wright, R. (1995, January 2.). Hyper-democracy: Washington isn't dangerously disconnected from the people; the trouble may be it's too plugged in. *Time, 145* (3), 15-21.]

Implications

We appear to be forging ahead to implement currently popular notions (for example, a Constitutional requirement for a balanced federal budget, or "federal mandate, federal pay" principle) without considering the cascading effect that may be felt across our national government and down into state and local governments. Similarly, the movement toward the removal of national rules to favor local controls may prove disastrous. As Peter Drucker admonishes Americans, we need to reconsider in a thoughtful way what—and at which level(s) in our federal system—government should be revised in order to meet its Constitutional responsibilities. The questioning and rethinking exercise that Drucker suggests should lead us to serious debate about the role of government and its division of responsibilities among the levels in the federal system.

However, as Wright and Broder caution, growing societal fragmentation and the communications technology blitz have made it possible for the best organized and best financed interest groups to simulate a national mandate in support of their narrow interests. In the last issue of *On the Horizon*, we spoke of an approach used in Denmark to increase public understanding of pressing

policy issues. The Internet and other electronic means can also improve the national dialogue. Colleges, universities, and public schools could play an important role in this process by initiating year-long "great issues" colloquia in which scholars would present divergent views as the basis for discussions both on-campus and off. The scholarly panel, reacting to the on-going interchange with and among its audience, would have as its goal the development of a consensus position on particular topics. Such dialogues would provide a balance against the special interests and bring us closer to a national consensus on what government should be doing in the 21st century.

COMMENTARY

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Using Technology to Transform Higher Education

Large class introductory courses in colleges and universities are usually taught as lectures, sometimes complemented with small "recitation" sections, in order to solve the Triple Challenge: (a) how to achieve satisfactory educational outcomes, (b) for an adequate number of people, (c) at an acceptable cost.

Lecture courses depend on books, laboratories, studios, and faculty members themselves. Lectures, unfortunately, are not very effective; the material that is "covered" is often not learned. Research shows that many students become more confused rather than more informed by the lecture, although they disguise this with "understanding" faces and adequate test scores.

Today's technologies are increasing the possibilities for augmenting the learning/teaching process with experiential learning, collaborative teaching, and rich, frequent feedback.

Today's technologies are increasing the possibilities for augmenting the learning/teaching process with experiential learning, collaborative teaching, and rich, frequent feedback. More and more students have relatively easy access to computing, video, and telecommunications, and more and more faculty have become more technologically skilled. Here are three examples of the new approach:

The Rensselaer Polytechnic Institute (RPI) has virtually eliminated lectures from its giant introductory physics and calculus courses. For example "Physics 101" has eliminated the traditional routine: two lectures, two recitations and two labs a week (six hours). Instead RPI teaches two two-hour "studios" a week, each with 40-60 students, who work, often in groups, on simulated and real experiments, using software called the Comprehensive Unified Physics Learning Environment (CUPLE). CUPLE also provides a web of multimedia instructional materials. This software, funded by the Annenberg/CPB Project, IBM, and NSF, is available from Physics Academic Software, an offshoot of the American Institute of Physics. Similar reforms are under way in other freshman year required courses. Students gain control over the time, place and pace of instruction. Faculty are happy because of dramatic improvements both in students' true understanding and in student ratings of the faculty's teaching. For more information about physics, calculus and the other courses that are being restructured, contact Jack Wilson (wilsoj@rpi.edu; 518 276-4853).

Introductory psychology at the Indiana University Purdue University at Indianapolis (IUPUI) enrolls 1,300 students. Of the students taking the course, a third were failing. IUPUI put collaborative learning to work by starting small classes and centralizing assessment. Faculty section leaders are not permitted to lecture; their role is to foster learning, and they each have wide latitude about how to do that. Videotaped lectures were made available in campus and city libraries and for rental. Testing was computerized, to be taken any time during a week in one of two computer clusters. Study options now include differing amounts of class time.

The course, while influenced by the Annenberg/CPB-funded New Pathways project, was created solely with departmental funds plus a loan from the central administration, to be repaid by savings. Student satisfaction ratings are up sharply (from 23% to 45%). Attendance is up and grades are up. Contact person for the course is Professor John Kremer (jkremer@indyvax.iupui.edu; 317-274-6760).

The Odyssey Project at Arizona State University has transformed an introductory humanities course that enrolls 130+ students per section from a traditional "sleep and slides" survey course to a computer-based, collaborative exploration by student teams. The information base for the course was computerized and placed into a hypertext knowledge base. The underlying hypertext program includes a telecommunications component, with e-mail and access to the Internet. Students work in teams, become "experts" in particular areas, and then teach their fellow group members (in class) their piece of the information (a "jigsaw structure" in cooperative learning jargon). Class time is spent on processing, analyzing, and synthesizing information for individually produced, written essays. The first semester that Odyssey was used, the average attrition rate dropped from 30-35% to 10%. Contact is Paul Privateer (acpcp@asuvm.inre.asu.edu).

Three institutions, three introductory courses,

three slightly different approaches restructuring the foundation of higher education. The common elements are fostering more student responsibility for learning while giving students material more worth learning.

Methods & Techniques

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Environmental Scanning at Oakland Community College

Five-campus Oakland Community College (OCC) serves an area of almost 900 square miles. The largest community college in Michigan (annual enrollment 53,000), the College employs 300 full-time faculty.

In 1991, OCC established a formal environmental scanning process, initially focused on six areas: educational trends, occupational trends, enrollment, economy, resources and regulations, and external opinion. Seventy faculty and staff members participated in the process that resulted in a summary report, which outlined trends and their implications for the College.

The adoption of an environmental scanning process established a system for integrating this information into the planning process.

During the first two years of the program, the scanning process was embraced with great enthusiasm. In response to information gathered during the scanning process, the College developed a set of core competencies that are being integrated into all areas of the curriculum. Prior to 1991, strategic and academic planning had taken place without formalized channels for the inclusion of external information. The adoption of an environmental scanning process established a system for integrating this information into the planning process.

Enthusiasm for scanning, originally high, began to decline after the first two years. The reasons varied. The complex scanning committee structure was too cumbersome; many committee members were also involved in other initiatives; a significant portion of the college community had no involvement in planning. Furthermore, as the institutional emphasis shifted to the implementation of the strategic plan, scanning activities became less prominent, attendance at committee meetings decreased, and abstracting activity slowed. Finally, those involved in identifying trends and implications felt that they were receiving no validation from the external community.

OCC's goal is to make scanning an integral part of the strategic planning cycle, ensuring that the College is making decisions based on careful consideration of external trends.

In addressing these problems, it became apparent that if the environmental scanning process is to function effectively, those involved must remain responsive to not only the external factors that shape trends, but also to the interorganizational changes that impact the scanning process. Consequently, we restructured the process. The six scanning committees have been replaced with one core scanning group consisting of 12 OCC faculty and staff, focusing on macro-thinking and futuristic vision. However, the reduced committee size inhibits broad-based participation across the college community. The College hopes to address this issue through the establishment of a regular scanning publication and the maintenance of a feedback loop. Additionally, the scanning committee will sponsor a series of community symposia, open to all OCC faculty, staff, and students, on emerging trends that could affect the College.

Relying in part on graduate student employees to abstract previously identified materials relieves committee members of the time-consuming responsibility not only of reading but also of summarizing journal and newspaper articles for review. One faculty member, not on the scanning committee, teaches upper-level English students to write abstracts.

As part of the college-wide effort to enhance the quality and accessibility of information contributing to the processes of planning for OCC's future, the annual scanning report summarizing trends and implications has been changed to a triannual newsletter, *Impact*, which also includes general information on the importance of scanning, and the ways in which the College community can utilize this information.

In addition, the scanning committee has been made a permanent part of the college's council structure; thus the trends and implications identified in the scanning process now go directly to the appropriate councils for action. Furthermore, the committee now works with the College's Center for Social Research in sponsoring local, regional, and statewide symposia focusing on emerging trends and issues.

It is still too early to determine the effects of these changes. OCC's goal is to make scanning an integral part of the strategic planning cycle, ensuring that the College is making decisions based on careful consideration of external trends. Scanning activities will continue during the off-year of the biennial planning cycle, allowing the College to identify new issues each year while maintaining its focus on long-term trends. These initiatives demonstrate the College's responsiveness to the needs of the external community, thus supporting a critical element of the institutional vision. Finally, through the regular publication and distribution of *Impact*, scanning is a vehicle for improving communication among and between all members of the OCC community.

TOOLS

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Pragmatix: Information Design

Magic Cap (and Gown)

Several issues back, I wrote about the new venture that spun off of Apple to develop a technology for the "personal intelligent communicator." The company is called General Magic. The technology has two aspects—the Magic Cap software/hardware platform, including the easiest interface I've ever encountered; and a programming language for intelligent information agents called Telescript.

Through the generosity of General Magic, I've been living with a loaner unit of the first Magic Cap device, a paperback-sized version called the Sony Magic Link.

It has become difficult to imagine going through an ordinary business day, or business trip, without Magic Cap or a subsequent generation of Magic Cap.

My evaluation? After a couple of months, it has become difficult to imagine going through an ordinary business day, or business trip, without it or a subsequent generation of it. What is the "it" that I have become so habituated to?

Magic Cap is a number of immediately familiar settings, or "scenes" on the screen. The most frequently visited scene is a clock on the wall, in- and outboxes, a blank postcard, a desk, a phone, a desk calendar, a Rolodex-like file, and a file cabinet. The clock tells the time, it's not just an icon. The inbox and outbox show you if you have messages that you've not dealt with. Any unfinished communications reside on the desk as unsealed, but named, envelopes, waiting to be dropped in the out-box. The desk has two drawers that open when you touch them, one with various kinds of stationery (you can create your own variations, such as personal and business) and a drawer with a wallet, a ledger, a notebook, a calculator and a remote control device.

The wallet is Pocket Quicken, by Intuit. Touch it with a finger-tip or the special stylus, and it opens to reveal a check, a dollar bill and a couple of credit cards. You can set up as many accounts as you need, assign expenses and income as they occur, and, if you're careful, you'll have the most complete information you could hope for when tax time rolls around. Of course it can be synchronized with Quicken on your desktop computer, with the proper connection kit.

Magic Cap is a *communication* environment.

The ledger is PenCell, a great little spreadsheet with a ton of familiar functions and a set of handy templates, including an expense report that already knows what day it is, a register for grades, a bill splitter that can help you determine who owes what at lunch (it'll even figure the tip) and the usual array of loan and mortgage calculators. Of course, you can easily start with a blank spreadsheet if you prefer.

It is important to bear in mind that Quicken and PenCell are programmed and sold by independent software developers that General Magic has licensed to write for Magic Cap and that Sony has paid for the right to include with the Sony device. Magic Cap is the environment, the individual tools are generally by someone else, and the whole combination resides on hardware produced and marketed by yet another company, in this case Sony. (So, can you guess what the remote control is for? Does it help if I tell you that there is an infrared beamer along one edge of the Sony Magic Link? Unfortunately, I don't happen to own any remote-controllable Sony products, but if I did I could turn on my CD player while calculating the yield on my CDs.)

Most important, though, Magic Cap is a *communication* environment. General Magic has stipulated that any device made to use Magic Cap must be capable of being connected to a phone line. The Sony I'm using has a standard phone jack, and ships with about three feet of phone cord, which links me to yet another part of the incredible business arrangement that General Magic has pulled off—AT&T PersonaLink Services, created specifically by AT&T for Magic Cap communication.

When I went to Seattle recently, I set my UNC e-mail account to forward to my PersonaLink account. In my hotel room, I used two touches of the screen to tell the Magic Link that I was in a place where it needed to dial 9 for an outside local line, and that I was out of my area code. From then on, by simply plugging into the data port on the room phone, the Magic Link automatically knew it was connected to a phone line, called the AT&T 800 number, and collected my e-mail. The first day, I got about 108 messages, many of them from various listservs.

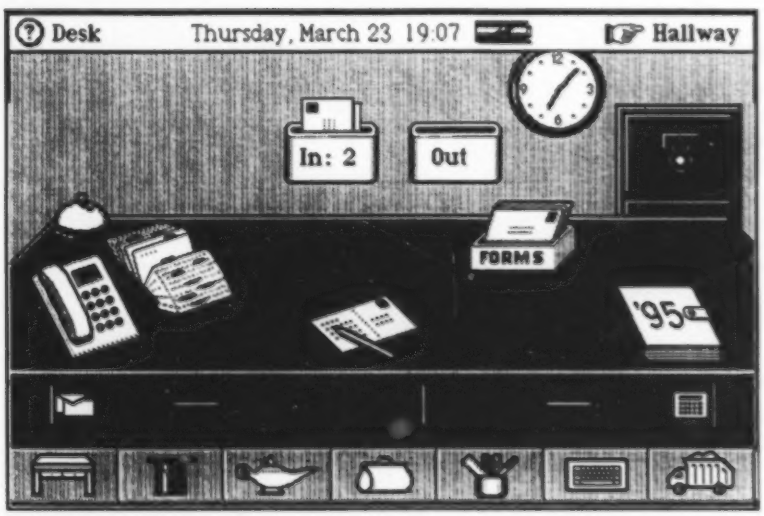
So I sent my AT&T mailbox a message to hold all my listserv mail. Then I told Magic Link to order a summary first. I used check-boxes in the summary to collect the messages I wanted and to delete those I didn't. I carried the Magic Link around with me, using spare time to reply to mail, and put my outgoing mail into the out-box. As soon as the opportunity presented itself, I plugged into a phone line and not only sent e-mail to those who have e-mail addresses, but used one of AT&T's services to send some messages via PersonaLink to people's fax machines. I could have faxed directly from the Magic Link to just about any fax machine in the world, and the Magic Link would have automatically charged the call to my phone credit card. (That's the only way to send graphics, at the moment, except to another Magic Cap device.)

The illustration on page 15 shows you the screen of my Magic Link as I write this column. Touching the desk in the lower left corner takes me to the office scene I mentioned earlier. The top

hat contains a variety of goodies for modifying scenes, adding illustrations to letters, even recording short voice notes that can be attached to mail going to other Magic Cap users. The magic lantern contains tools for faxing or e-mailing whatever is on the screen, and lets you set the rules for a particular scene. The office scene, for example, contains an icon that I touch to straighten my cluttered desk. The tote bag next to the lamp might have been called the clipboard or scrapbook in another environment; it can accumulate items copied from one scene for use in other scenes.

The cup of pencils contains drawing tools and other items for customizing documents. The keyboard icon calls up a virtual keyboard that is fine for short messages. The trash truck is where you drag things you want to throw away. The icons along the right include an extend button, which adds white space at the bottom of the page.

I'm using a non-virtual keyboard at the moment, about the area of those on most laptops, connected by a short cable to the magic link. It fits easily into a pocket of my briefcase, and weighs about six ounces.



As I write this, an alarm that I set in my desk calendar just went off to remind me of an appointment with a new client. If I touch the rolodex, it will open automatically to his card. I can touch it to dial his phone number. If I touch the calendar, it will open the appointment entry to remind me of the topics we are supposed to cover. If I call him, I can open a log to record the major points of the conversation, and the length of time the call took. I can print the log, e-mail it, or fax it, and I can attach it to my invoice and fax them both. When I set up the appointment in the first place, the calendar would have sent a letter notifying him of the meeting if I had asked it to.

If he'd received it with a Magic Cap device, it would have buttons he could push to send me return mail confirming the date.

Magic Cap for Windows and the Mac is under development, so that you'll be able to have a desk on your desktop as well as in your briefcase.

If finding a phone line to send and receive mail seems a trifle inconvenient, rest easy. The same Magic Cap environment has been licensed by Motorola for a wireless device—the Envoy. On a long cab ride, in an interminable presentation, send and receive e-mail just as if you were connected to a phone line. I haven't used one but I've held one in my hands. (Motorola's act does not seem to be entirely together yet. Two calls to their 800 number to find out where I might buy one yielded no information of any value whatever. The second operator at 1-800-WIRELESS actually refused to speak with me.) But when and if I do use an Envoy, you'll see the review here.

There is no single aspect of this device that makes it so valuable, nor is there one that I could not make better. The screen is not illuminated, so there are times when the light is either too dim or too bright. The modem is too slow. The memory management tends to be flawed, so it will tell you it is running out of memory when it is not. But the whole is so much more than the sum of the parts, and it is so immediately useful, that it more than overcomes any problems with individual elements. (I have seen people who never operated a computer pick up my Magic Link, set up a letter, enter it, and fax it.)

So what Is "It" ?

"It" is the sense of connectedness with colleagues, the ability to handle important correspondence quickly, to keep track of obligations and appointments. "It" is the support given by all the collaborators in this highly complex venture—AT&T, Sony, General Magic, and the individual software developers. The most outstanding of these for me has been AT&T and their remarkably efficient and helpful director of customer services, Jim Benninger.

Customer support

Customer support in high tech is high stress. People don't usually call because they are happy. And a communication tool that is giving a problem is worse than no tool at all. Jim and his staff handle these calls in a friendly manner, show they have understood what the caller was really trying to say and find the solution for them. The atmosphere in Jim Benninger's AT&T customer service is the result of mutually supportive professional conversation.

Ultimately this department demonstrates an attitude of concern for the person who calls with a problem or a complaint. This attitude works its way through the staff to the customer, and through the Magic Cap environment, to the user. Jim Benninger and the technology he supports give a whole new meaning to "user-friendly."

Does your school have such a setup to deal with the public, the students and their parents? If not, take heed; if so, congratulations.

Tossing the caber at the Highland Games, Saint Andrews, Scotland.

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Call for Briefing Papers

This is a call for briefing papers on two topics: (1) Global Change: Challenges for Education or (2) Planning Systems Designed to Meet the Challenges of Global Changes. Each briefing paper should be 5-10 pages, single-spaced. The deadline for full text of the briefing paper is 30 June 1995.

To submit a briefing paper, send a one-page abstract no later than 30 May 1995 to James L. Morrison.

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On the Horizon

the environmental scanning newsletter for leaders in education

June/July 1995 • Volume 3 Number 5

School Is Out—Learning Is In

Terry O'Banion
League for Innovation in the Community College

April 26, 1983, became one of the most important dates in the modern history of education when *A Nation at Risk: The Imperative for Educational Reform* was published. Ted Bell, then U. S. Commissioner of Education and Chair of the commission that published the report, said American education was experiencing "a rising tide of mediocrity," and if we did not address the issues facing American education, the system would be totally overwhelmed.

A Nation at Risk elicited a massive reform movement to *improve standards* (e.g., require more courses in high school, develop national certification standards for teachers, develop national standards for every major job category), *apply innovations* (e.g., expand use of computers, interactive learning, distance education, and work-based learning opportunities), *revise structures* (e.g., create year-round schools, allocate decision-making to the local level, use total quality management and continuous quality improvement processes), and *develop alternatives* to the existing system (e.g., create a voucher system, privatize public schools, and create middle schools, cluster schools, and schools managed by universities).

These reform efforts have resulted in a great deal of change, but very little improvement. In a 1993 national study of adult literacy, for example, students were asked, "If you had three dollars, bought a sandwich for $1.95 and a bowl of soup for $0.60, how much would you have left?" More than 56% of the respondents polled could not calculate the remaining change (45¢). The reform movement has just been pruning the branches of a dead tree.

The reform movement has just been pruning the branches of a dead tree.

Why is this? Why has a decade of reform produced so little? Perhaps it is, in part, because our current educational practices are bound by time, place, efficiency, and teachers themselves. For example:

1. The system is *time-bound* by credit hours and semester courses. College students are learning in blocks of time that are artificial. Excellent teachers know that learning is not constrained to one-hour meetings held on Monday, Wednesday, and Friday, and they have been frustrated in teaching within these prescribed boundaries.

2. The system is *place-bound*. Learning is initiated, nurtured, monitored, and certified primarily by teachers in classrooms on a campus. We have experimented with distance education that takes courses off campus, but while it has increased student access, it retains the old model of education: distance education is a nontraditional delivery system for traditional education. Work-based learning was supposed to break up that model, but it doesn't—it extends the model, but it is still controlled by it, because work-based learning is built around the structure of the school. It still binds the student to a place.

3. The system is *efficiency-bound*. Our model of education reflects in great part the adjustment to

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In the last decade we have spent great amounts of energy and resources redesigning, reengineering, revising, reforming, recycling, and reordering a system that no longer works.

We have been busy trying to make a coal-burning locomotive our major mode of transportation when across the tarmac there are options such as the Concorde and the space shuttle.

All students need a K-90 system, for learning is lifelong and continuous.

an agricultural economy. Public school students needed to be home early enough in the afternoon to milk the cows and feed the chickens. In the summer, they needed to be free for three to four months—to work in the fields, to pick the cotton in the South, to pick the peaches in California, and to harvest the corn in the Midwest. When the country changed to the industrial economy, education responded by creating a lock-step, put-them-in-boxes, factory model—the basis of American education today. Academic credit, based on time in class, makes learning appear orderly. This model creates an efficient system to award credentials. The college structure of Monday-Wednesday-Friday classes in a 16-week semester, while plowing through a specified body of material, makes teachers feel as if they have accomplished their goals. But what does 64 credit hours worth of learning mean to Student A compared to Student B, especially when the credit is based on grades? According to Paul Dressel, the course grade is "an inadequate report of an inaccurate judgment by biased and variable judges of the extent to which a student has attained an undefined level of mastery of an unknown proportion of an indefinite material." Yet the entire system of schooling is based on grades accumulated as credits.

4. Finally, this system is *teacher-bound*, which may be its greatest weakness. In education, we make the assumption that one human being, the teacher, can ensure that 30 very different human beings, one hour a day, three or more days a week for 16 weeks, can learn enough to become enlightened citizens, productive workers and joyful lifelong learners. Then we assume that this one human being can repeat this miracle three more times in the same 16-week period for 90 additional individuals. Furthermore, we have saddled teachers with expectations that they must be experts in rapidly-expanding fields of knowledge and gifted lecturers to deliver their knowledge. And we provide little comfort and support when they fail to live up to the myth.

In the last decade we have spent great amounts of energy and resources redesigning, reengineering, revising, reforming, recycling, and reordering a system that no longer works.

We have been busy trying to make a coal-burning locomotive our major mode of transportation when across the tarmac there are options such as the Concorde and the space shuttle.

Thus we need to replace the current educational system with a system designed for the kind of society in which we live today, designed for the kinds of students who attend school today, and designed to take advantage of what we know about learning and what we know about technology today.

The Emerging Transformation To Place Learning First

The emerging transformation in education places learning first, before teaching. A new concept is evolving: School is out, learning is in. The new transformation is based on the following guidelines:

1. The purpose of school is to improve and expand student learning. Students want to learn. Students learn differently. They learn from each other. They need customized learning, learning that offers many options, including stand-alone technology and opportunities to learn outside as well as inside "school." Postsecondary students need schools that allow them to exit and reenter. All students need a K-90 system, for learning is lifelong and continuous. They need a system that allows them to enter 365 days a year, 24 hours a day, seven days a week. The system must provide road maps, itineraries, optional routes, tours, rest stops for feedback, opportunities to make new connections, and access to major databases and expert systems throughout the world. They must be allowed to change directions, to move back and forth, to make U-turns for remediation, and to call for assistance when they hit roadblocks.

2. Student assessment is critical. Teachers, staff, and administrators must pay more attention to assessing student abilities, achievements, values, goals, expectations, and environmental limitations. Students need learning portfolios about what they know, what they don't know, what they want to know, and what they need to know. Standards for initial entry into and exit from all formal learning activities must be clearly articulated. Learning outcomes must focus on "What does this student know?" and "What can this student do?"

3. Faculty and staff roles must change. Teachers must design and manage, not deliver, learning experiences. They must be evaluated on how well they implement new learning opportunities for students in a system that is not time-bound, place-bound, efficiency-bound, or teacher-bound. The entire staff of the college must be involved in placing learning first.

Forces of Resistance

As these tentative guidelines are translated into action, there will be resistance from bureaucracies, from school personnel, and from students themselves.

Bureaucratic resistance. Federal and state programs are difficult to dismantle, as every newly-elected politician soon learns. The education code for California, for example, is contained in 7,000

continued on page 5

From the Editor

James L. Morrison
The University of North Carolina at Chapel Hill

Issues Challenging Education

In the last issue (Morrison, 1995), I stated that using the combination of *Horizon List*, *Horizon Home Page* and *On the Horizon* illustrated how education would be conducted in the 21st century. The basis of my statement was that posting draft articles on *Horizon List* for comment allowed for rigorous critique from a large number of people from around the world, thereby strengthening the articles, which were then published. *Horizon Home Page* is an easily accessible archive (point and click if you have a browser) of papers and commentary. This process enables people not subscribed to *Horizon List* to comment on the articles and responses to the articles, and these comments are posted, thereby adding to the commentary. Thus, as Carvin (1995, February/March) illustrated earlier, Web pages and a listserv allow students to post drafts, receive comment/criticism, and redraft their papers.

It occurred to me that if this is valid, why wait until the 21st century? Why not put one of my courses on *Horizon Home Page* now?

Fortuitously, a few weeks ago I was assigned to teach a new (for me) course on the social context

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On the Horizon focuses on potential developments and critical trends affecting education. It is published in October/November, December/January, February/March, April/May, and June /July by the Institute for Academic and Professional Leadership, School of Education, The University of North Carolina at Chapel Hill. ISSN 1074-8121. Annual cost: individual, $24.50; organizational, $49.50; site license, $124.50. For more information, contact Professor James L. Morrison, Editor, *On the Horizon*, or Assistants to the Editor, Jonathan Barker, Adam Bianchi, or Robbi Pickeral, CB# 3500 Peabody Hall, University of North Carolina, Chapel Hill, NC 27599. (919) 962-2517. Fax: (919) 962-1533. Internet: Morrison@unc.edu.

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BEST COPY AVAILABLE

Draft issue briefs describing issue focus, background, driving forces, future prospects, and implications will be posted in the *Issues Challenging Education* section of *Horizon Home Page*, so that not only can class members read and critique the drafts, but so can anyone who browses our Web site.

Please send me your list of issues or an issue brief.

of educational leadership for Spring 1996 that focuses on the past, present, and future contexts of issues that affect education. It is a required course for masters and doctoral students in educational leadership.

The specific objectives of the course will be to develop or to improve competencies to achieve the following:

- conduct an analysis of critical issues in education and the social context within which they are formed
- use the Internet's information resources to inform issue analyses
- use multimedia presentation tools to communicate issue analyses
- use written and oral expression effectively in issue analysis presentations

It occurred to me that we could add a feature to *On the Horizon* titled *Issues Challenging Education* where we would periodically include briefs (800-1,000 word documents) on salient issues that must be considered when planning for the future. Result: a call for issue briefs (see page 5).

Please consider writing an issue brief. This is tough work, but you will get the satisfaction of presenting your thoughts and insights to colleagues around the world plus a publication credit. Whether or not your brief is published in *On the Horizon*, you may be confident that it will be posted in the newly created *Issues Challenging Education* section of *Horizon Home Page*, where there is no shortage of space (unlike a five-times-a-year, 16 page newsletter).

A somewhat easier task is to nominate salient issues that would be candidates for students to consider when they are faced with deciding which issues they will tackle. All such submissions are eligible for posting on *Horizon Home Page* where they will invite comment and discussion from those browsing our Web site (which in turn will stimulate further discussion, which will also be posted).

Nominated issues and issue briefs posted on *Horizon Home Page* will be easily accessible. Entering the *Home Page*, you will see an index of the section titled *Issues Challenging Education*. Click on this title, and you will be carried to a new screen listing each issue. Click on an issue title, and the next screen will have either a description of the issue or a full issue brief, the name and e-mail address of the person nominating that issue (or writing the brief), and related comments. To comment, enter your message, which will come to me for editing and posting.

My class in the spring will focus first on critical issues facing education, using the issues posted on *Horizon Home Page* as a starting point, but also using information databases on the Internet and educational literature to flesh out the identification of critical issues. We will then select those we think are most critical. To give realism and perspective, we will simulate a special issue analysis task force for the U.S. Department of Education, with the expectation of presenting a series of issue briefs to the Department senior staff at the conclusion of the semester.

Draft issue briefs describing issue focus, background, driving forces, future prospects, and implications will be posted in the *Issues Challenging Education* section of *Horizon Home Page*, so that not only can class members read and critique the drafts, but so can anyone who browses our Web site. All comments will be posted, and can be used by students as they revise their drafts. At the conclusion of the semester, students will present their analyses to the class, and will be encouraged to submit their papers to *On the Horizon* for publication consideration.

I hope to realize a number of advantages by using the technology provided via the Internet and production software (e.g., PowerPoint, Word) in the course. First, students will benefit by having a multi-authored list of issues via *Horizon Home Page* to consider as they begin the course. Second, my role will not be "sage on the stage," but "guide on the side." I will not lecture on the salient issues I see, but rather, will assist students to get information themselves about issues from a variety of sources, including the Internet, and will assist them to present their analyses using multimedia tools to a professional audience. Third, this shift in instructor role creates an active learning environment where students spend most of their time exploring information sources, as opposed to passively responding to a lecture. Fourth, by publishing drafts on *Horizon Home Page*, students will gain an appreciation of the value of criticism in improving their writing, thoughts, and skills. Moreover, the idea of sharing one's writing with an untold number of people throughout the world may stimulate a greater concern for improving one's writing skills! Finally, by using the Internet and production software, future leaders of educational organizations will become sufficiently competent in these technologies to move their schools into the 21st century more effectively.

To make this project a success, I will need widespread input. Please send me your list of issues or an issue brief. Subscribe to *Horizon List* and post your nominations/briefs to the *List*, which I will insert on *Horizon Home Page*.

To subscribe to *Horizon List*, send the following e-mail message to listserv@unc.edu: subscribe horizon <your name> (no period). The URL address of *Horizon Home Page* is: http://sunsite.unc.edu/horizon (no period).

[Carvin, A. (1995, February/March). The

world wide web: The killer application for education? *On the Horizon, 3* (3), 13-14; Morrison, J. (1995, April/May). *On the horizon, horizon list, horizon home page*: A forerunner of education in the 21st century. *On the Horizon, 3* (4), 3-4.

•••

Most educators understand the old saw "It is easier to move a cemetery than change the curriculum." Fortunately, there are always small groups of maverick faculty who will try any new idea, the early adopters of innovations.

Call for Issue Briefs

Issues Challenging Education

This is a call for issue briefs on issues stemming from the social, technological, economic, environmental, or political sectors that educators must consider when planning for the future of their organizations. Each issue brief should address the following questions:

- What is the issue focus?
- What is the background of the issue?
- What are the forces driving the issue?
- Where is the issue going? What are its prospects?
- What are the implications of the issue for (any or all) levels of education?
- What should educational leaders do?

E-mail your issue brief to morrison@unc.edu, or mail a disk and hard copy of the issue brief to James L. Morrison at the *On the Horizon* office.

continued from page 2

pages in 11 volumes. All American colleges and schools have developed cumbersome and often politically-structured systems. While these are designed for effective, efficient, and fair management, they frequently inhibit rather than encourage creative ventures that differ from the established norms.

Although many educational leaders are aware of the regulatory policies' restrictive potential and try to encourage new ideas, innovators do not outnumber the safe-haven traditionalists. In California, one of the most regulated environments in the nation, the chancellor of the community colleges system has issued a challenge to community college leaders to request waivers from state regulations that keep the colleges from innovating and experimenting. Requests for such waivers have not been overwhelming.

Personnel resistance. Most educators understand the old saw "It is easier to move a cemetery than change the curriculum." Fortunately, there are always small groups of maverick faculty who will try any new idea, the early adopters of innovations. But the faculty as a whole is highly resistant to change. Their allegiance to the discipline guilds and the protective mantle of academic freedom are twin pillars of conservatism. Educators, themselves "schooled" first as students, then as gatekeepers in the traditions of education, do not embrace alternative ideas with enthusiasm, despite their own deep cynicism about the current system.

The greatest resistance to placing learning first may come from students (and their parents).

Administrators, especially first-line administrators (e.g., department and division heads who interact directly with faculty), are most resistant to change. Their position is particularly stressful as they attempt to negotiate between the faculty and the administration, a land in which first-line administrators can find no safe haven or affiliative group. Negotiating the selection of textbooks and constructing the class schedule is challenge enough for the brave souls who carry one of the major burdens in an educational organization. They are not likely to lead the charge to place learning first, even though they may be the key staff members who understand best the need for such change.

There will also be resistance from custodians, secretaries, bookstore clerks, and other support staff who operate key components of the school's infrastructure. Placing learning first may change the roles of support staff, making them more visible partners with the professional staff. Support staff will be required to help manage and coordinate learning activities as faculty are freed to share their expertise and skills in new ways with students and each other. Some support staff will feel unprepared to take on these new assignments and will need encouragement, training, and recognition to overcome the natural resistance that will emerge.

Student resistance. The greatest resistance to placing learning first may come from students (and their parents). Students know classes. They know schedules. They have spent their whole lives trying to get As. Placing learning first would mean taking responsibility for learning and navigating their own pathway. Students will need a great deal of orientation to this new paradigm, and they will need early success experiences.

The Future

New models of the paradigm are percolating to the top.

Can the transformational model outlined above reach fruition anytime soon or even in our lifetimes? Are we capable of creating and adapting to that much change?

We are beginning to see small islands of innovation. New models of the paradigm are percolating to the top. A handful of colleges have launched the transformation and provide some direction for the greater revolution to follow:

- The Dallas County Community College District has published a statement titled "Masters of the Learning Environment." Full-time faculty members are responsible for designing the instructional delivery system in their areas that will best increase the quality and quantity of individual learning while decreasing the cost per student in that learning environment. Although this system is still within the context of the old industrial educational model, there is an emerging philosophy that places learning first and makes faculty responsible for learning outcomes.
- Lane Community College in Eugene, Oregon, has developed a comprehensive statement for a vision of its future as a learning organization:

Lane Community College provides a quality learning experience in a caring environment. Lane is centered on learning and will assume new responsibilities only when they involve learning. Everyone at Lane must be dedicated to learning. The organization must be a learning organization...change must be built into our organization.

Lane is providing a new direction for community colleges in the language of its vision statement, which reflects the heart, mission, and values of the institution. Note that the goals of traditional schools and colleges have historically been to provide instruction, not to cause learning. The community college itself is known as the teaching college and has deans of instruction, not deans of learning. Lane is changing its language to place learning first. As the language changes, the values and practices also begin to change.

- Staff and faculty at the Maricopa Community Colleges in Phoenix, Arizona, have been deeply involved in reviewing changes at their institutions through participation in the Pew Higher Education Roundtables. They have launched Project Apollo to create a learner-centered system and have engaged their board of governors in a "strategic conversation" on the learning organization. The Maricopa Community Colleges have made a major commitment to live up to their new vision statement, "We are a learning organization guided by our shared values."
- Palomar College and Chaffey College, both in Southern California, have also initiated projects to move their colleges toward a new paradigm of learning.

These five institutions are examples of community colleges struggling to find a new way to place learning first. They share strong and effective leadership at the top, faculty mavericks who are not afraid to innovate, a diversity of students, and an understanding of and experimentation with technology as a key element in transforming learning. In addition, they are healthy institutions with resources and experience in leading change. These institutions will serve as crucibles of innovation for transforming colleges into learning organizations. They bear watching, for they are engaged in a process of change that will turn education upside down if they are successful in placing learning first.

In a future issue I will describe more fully how a learning-first organization will function, using these exlemplary institutions as illustrations.

In a future issue I will describe more fully how a learning-first organization will function, using these exlemplary institutions as illustrations. I welcome your comments on the concept briefly presented here.

[Editor's note: This article is modified from an address by Dr. O'Banion at *Beyond 2000: Visioning the Future of Community Colleges, The 1995 Inaugural Futures Assembly*, February 26-28, 1995, in Orlando, Fla.. The article is posted in the conference section, *Horizon Home Page* (URL address: http://sunsite.unc.edu/horizon), along with other presentations and proceedings of this conference. Please write or e-mail your responses to this and other articles in this issue; we will post your messages on *Horizon Home Page* for continuing comment and review.]

SOCIAL

Merrill Pritchett
University of Baltimore

Reengineering

The reengineering revolution these days falls into one of three categories. First are the advocacy works that recite reengineering success stories to justify the effort. Second are the highly technical accounts of how to use the reengineering tool kit to redesign a process. Lastly, and the predominant type in higher education, are the "this is what we did and how we did it" accounts that elucidate the reengineering of a particular process in a specific organization. Generally missing in all three is any discussion of two keys to successful reengineering—overcoming resistance to change and changing institutional values.

Michael Hammer and Steven A. Stanton (1995) provide practical advice about how to promote change in the people and the values of the organization. They stress that resistance to change is natural, that the reengineer should expect it, indeed should seek it out and try to understand the motivations that underlie it. They suggest that there are five "I" words for overcoming resistance.

There is no practical difference in many processes used by business and non-profits.

In many educational institutions, reengineering (or TQM for that matter) goes aground on the matter of identifying customers.

Incentives, particularly financial, both positive and negative are necessary. *Information* includes the facts about the reengineering effort that make it easier to live with. *Intervention* deals with resistance to change by dealing with people one on one so that they can overcome their fear and distrust of change. *Indoctrination* means making people realize that reengineering is going to happen; it is inevitable. *Involvement* means "co-opting people into the reengineering effort so that they are criticizing from the inside rather than resisting form the outside" (p. 130). This sage advice is, of course, not new to any student of organizational development, but it is refreshing to see it being advocated by hardheaded management types.

It is equally pleasing to see that Hammer and Stanton address the question of organizational values. A shift in organizational values must take place if reengineering is to succeed. A failure to realign values is a "recipe for chaos" (p. 158). The new values must be internalized by those who work in the reengineering process.

A hallmark of reengineering is that it creates processes with far greater flexibility than those they replace. Rule books and manuals become largely irrelevant, as the members of the process teams learn to focus on customers and results (p. 158).

Hammer and Stanton acknowledge that values are difficult to change; they heap scorn on many superficial efforts that are popular in the corporate world today. Vision statements are subject to particular abuse at the hands of Hammer and Stanton. Such statements are "... touching affirmations of management's belief in the power of cliche to alter and modify behavior" (p. 161). Real change in values comes about first when the values are built into the reengineered process. If one value is to put the customer first, the reengineered process must guarantee that feedback from the customer is heard and acted on. Second, executives must walk the talk; their personal behavior must demonstrate commitment to the new values. Third, the company must be serious about its realigned values, in both good and bad times. Lastly, the rewards handed out by the organization must reflect its values; if one value is teamwork but only individual achievement is rewarded financially, can it be said that teamwork is really a valued behavior?

[Hammer, M and Stanton, S. (1995). *The reengineering revolution: A handbook*. New York: Harper Business.]

Implications

Hammer and Stanton make their book germane to education in a short chapter entitled "Beyond the Bottom Line: Reengineering in Mission-Driven Organizations." Critics often argue that reengineering is inappropriate because educational organizations are not run by the discipline of the bottom line. They are different; they are not businesses. However, Hammer and Stanton argue that there is no practical difference in many processes used by business and non-profits alike; purchasing is purchasing, personnel hiring is personnel hiring. Administrative processes are the ones most often reengineered in education institutions. Reengineering teaching, research, and service efforts has proven to be more intractable.

Reengineers in mission-driven organizations, according to Hammer and Stanton, face four special challenges. First they must identify and then try to understand who their customers are. In many educational institutions, reengineering (or TQM for that matter) goes aground on the matter of identifying customers. This isn't an easy task, but they assert that it must be done. Providing better service to customers is the whole point of reengineering. Second, non-profits must come up with measurable performance standards. Measuring the success in mission-driven institutions is not as easy as in profit centered organizations where profit, earnings, and stock price are the bottom line. Nonetheless, for reengineering to succeed, specific performance measures must be created because they are the mileposts used to judge the progress of the effort. Third, reengineers in mission-driven organizations must be sensitive to the concerns of the idealists in the institution. Principle, not just self-interest, may be a real reason for opposition to reengineering in the nonprofit sector. On the other hand, opponents of change often use organizational mission as a shield to hide behind. Last, the mission-driven organization must truly know what its mission is, it must know what business it is in, and it must know what its purpose is.

Hammer and Stanton have no magic answer to deal with these challenges. Perhaps there will be an enlarged chapter on mission-driven institutions in the next handbook of reengineering. Perhaps it will be written by someone in education.

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On the Horizon Call for Manuscripts

On the Horizon articles take two forms: *abstracts* of one or more articles/books/Internet postings that have implications for education, or *essays* on emerging trends or developments that may affect the future of education. A unique feature of abstracts or essays in *On the Horizon* is that authors speculate on the specific implications of "signals of change" in the macroenvironment for educational leaders. Abstracts and essays are brief (800-1,000 words); our readers are busy people who want get to the bottom line quickly. Send manuscripts to James L. Morrison, Editor, *On the Horizon*, CB 3500 Peabody Hall, UNC-Chapel Hill, Chapel Hill, NC 27599. E-mail: morrison@unc.edu.

TECHNOLOGICAL

Christopher Dede
George Mason University

Beyond the Information "Superhighway" . . .

The National Information Infrastructure (NII) is a vehicle for virtual communities, a conduit for knowledge utilities, and a synthetic environment with new frontiers to explore and experience. During the next decade, these emerging capabilities will leverage more change in education than has occurred over the past two centuries.

High-performance computing and wide-area, broadbandwidth networking, the newest technological advances, empower the NII to become a ubiquitous, enormous channel for data. Different from prior evolutions, NII is fusing together the radio, television, telephone, copier, fax, scanner, printer, and computer, all of which will eventually coexist in a single box. In two decades, the ecology of information technologies will have only a few super-species remaining ("teleputers?" "compuvisions?") that integrate the capabilities of all devices.

NII is fusing together the radio, television, telephone, copier, fax, scanner, printer, and computer, all of which will eventually coexist in a single box.

Beyond ease of use from a consumer's perspective, this fusion has enormous implications for information technology vendors. Merging technologies means merging markets. Tens of thousands of current organizations (e.g., telephone companies, computer corporations, radio stations, television broadcasters, cable narrowcasters, publishers, on-line databases, newspapers, and libraries) will ally, acquire, and expire into just three or four partnerships that will be the core information providers for our society.

What does all this mean for education? Information technology is restructuring American business: eliminating jobs, recasting traditional roles, creating both expanded markets and new competitors by transcending barriers of distance and time. Similarly, the educational implications of the NII go beyond enabling the transportation of data anywhere, on-demand, to empowering new delivery systems for learning.

Ubiquitous access to sophisticated information undermines the campus-based, classroom-centered structure of academic learning environments.

Ubiquitous access to sophisticated information undermines the campus-based, classroom-centered structure of academic learning environments. Virtual communities can complement student/faculty face-to-face relationships. Presented with the alternative of technology-mediated interaction such as telephone registration or video-based classes in higher education, an ever increasing number of part-time students appreciate the convenience despite the loss of opportunities for spontaneous, face-to-face socializing.

In the NII, broadband networking coupled with collaborative tools create "telepresence," shared social environments without physical proximity. As education incorporates opportunities for telepresence in remote access to libraries, computer labs, on-line advising, and video-based classes, the convenience of just-in-time, anyplace service will shift academic interactions increasingly—but not completely—into virtual communities and classrooms without walls.

As the NII matures, education outside the classroom may supplement video-based instruction with immersion in synthetic, virtual environments made possible by distributed simulation, a training technique developed by the U.S. military. The shift to interpersonal and interactive instruction, a shift toward shared collaboration, mirrors the evolution of crucial workplace skills, satisfying many of the social needs students bring to higher education.

Through such teleapprenticeship approaches, a widely distributed group of students can engage in simulated, real-time experiences (e.g., virtual hospitals, factories). Their ability to apply abstract knowledge is enhanced by situating education in mentored, virtual contexts similar to the environments in which skills will be used. Moreover, knowledge taught just-in-time to resolve a problem is mastered more readily than when taught just-in-case as part of covering material. Interdisciplinary, learning-by-doing experiences in artificial environments made possible by the NII will likely supplement discipline-centered, campus-based teaching-by-telling.

Where will educational organizations find the resources to implement these alternative models of learning? Those schools and colleges with innovative alternatives to "talking heads" distance education must seek out vendors happy to share the costs in exchange for help with the regulators, legislators, and judges who are determining which coalitions will manage the NII. As with business, the evolution of technology will create new markets and expanded competitors.

With sufficient economies of scale, the NII may result in lower costs than our present system of similar standard courses duplicated at every institution. State legislatures may see this model as an attractive way to cut expenditures for higher education—applicable to every course for which a substantial textbook market exists. In this scenario, higher education would be reshaped as profoundly as American business has been altered by technologies enabling the global marketplace.

The NII is a meta-medium that synthesizes all prior media into a fusion greater than the sum of its parts. At present, most faculty and administrators are coping with its first impact: shifting from foraging for data to filtering a plethora of incoming information. Educational leaders in the next decade must develop a comprehension of how to use this new medium to empower new messages and mission, and of how to collaborate with and/or outperform competitors.

ECONOMIC

David L. Kendall
St. Edward's University

The Dollar May Be Falling, But the Sky is Not

In the last issue of *On the Horizon*, A. G. Kefalas argued that the falling dollar in foreign exchange markets is an ominous threat to the American economy; that the downward trend of the dollar's value against the yen (and mark) bode ill.

I disagree. The American economy is highly competitive in world markets. Throughout most of the 1980s, the U.S. economy enjoyed the longest peace-time expansion in real output and income ever—nearly a nine-year run. Following an unusually mild and brief recession, which began midway through 1990 and ended in the second quarter of 1991, real GDP resumed growth at a sustainable pace of 2% to 3% per year.

Actually, it's entirely understandable and even desirable that the dollar is again on a down trend versus the yen, and to a lesser extent the German mark.

Actually, it's entirely understandable and even desirable that the dollar is again on a down trend versus the yen, and to a lesser extent the German mark. Following America's inflation-financed war in Vietnam and nearly a decade of trade deficits, by 1971 the world was awash in more dollars than it wanted to hold. Rising U.S. inflation meant that dollars held by foreigners were losing purchasing power daily. U.S. citizens and the federal government were borrowing from the rest of the world to finance consumption of imports that was not offset by exports of domestic production.

When foreign citizens or their governments want fewer dollars to purchase U.S. exports or to lend to the United States by purchasing dollar-denominated IOUs, demand for dollars in foreign exchange markets tends to fall relative to supply. Naturally, the foreign currency price of dollars gets bid down as a consequence, other things unchanged. And that's just what happened throughout the 1970s. As economic theory predicts, dollar depreciation helped increase U.S. net exports during the 1970s.

Ultimately, international trade must be a two-way street. If the Japanese refuse to buy more U.S. exports, the exchange value of the dollar versus the yen will likely continue to fall.

By 1980, the U.S. economy was running the largest real-dollar trade surplus it had experienced in more than 25 years. Inflation reached double digits, and the Federal Reserve clamped down on growth of the nation's money supply, which increased nominal interest rates dramatically and plunged the nation into deep recession. But in response to a lower and more stable rate of inflation, a cut in marginal federal tax rates, and substantial federal deficit spending, the U.S. economy began an uninterrupted nine-year expansion following the recession of the early 1980s. By 1982, the dollar had regained its depreciation losses of the 1970s, and in 1985 stood more than 20% above its 1970 foreign exchange level.

It really was a matter of supply and demand for dollars in foreign exchange markets that caused the dollar's depreciation during the 1970s and its appreciation during the 1980s—and so it is today.

Dollars are supplied to foreign exchange markets by individuals, firms, or national governments who wish to trade dollars for the currency of some other nation. Dollars are demanded in foreign exchange markets by those who wish to trade some other nation's currency for dollars. Foreign exchange markets comprise multitudes of buyers and sellers, all motivated by disparate needs and wants. As such, foreign exchange rates cannot be influenced for long or much by speculators, or even by governments as large and rich as America's.

The dollar's recent and possibly continuing depreciation against the yen and mark is an inevitable response to a dogged U.S. trade deficit that requires financing to the tune of more than $12 billion a month. Financial investors around the world are once again growing wary of holding such large dollar-denominated IOU's. Continuing annual U.S. budget deficits portend future inflation in the minds of many around the world. Once again, history repeats itself.

U.S. exports must rise faster than imports for the next several years to restore long- term trade balance with the rest of the world. Ultimately, international trade must be a two-way street. If the Japanese refuse to buy more U.S. exports, the exchange value of the dollar versus the yen will likely continue to fall.

As financial investors around the world divest themselves of dollar-denominated IOU's or refuse to acquire more, the dollar will likely remain low versus the yen and mark, and perhaps depreciate even further. The falling foreign exchange value of the dollar will predictably increase U.S. exports relative to imports—just what the doctor ordered to restore long-period trade balance.

But trend changes in the dollar's exchange value should not cause particular alarm. Here's why:

- exchange rates, like other market prices, carry information about changing supply and demand conditions; efforts to eliminate fluctuations in exchange rates, short term or trend, are efforts to eliminate valuable information about reality.
- changes in exchange rates are usually symptoms, not causes.
- governments cannot promote fundamental trade imbalances forever; changes in exchange rates tend to force corrections, given enough time.

Since the dollar was freed to float in foreign exchange markets in 1971, global trade activity continues to expand dramatically, and with it, global real output and income. Though not the only cause of trade expansion, floating exchange rates have complemented freer trade world wide.

[Kefalas, A. G. (1995, April May). The new international financial (dis)order. *On the Horizon*, (3), 3, pp. 8-9.]

Implications

Demand for higher education increases as real incomes rise, and incomes rise faster in America with more international trade. Higher education will continue to benefit from real economic growth in the U.S. economy, which extensive international trade promotes. In return, broader consumption of higher education will stimulate even greater economic growth.

ENVIRONMENTAL

Daniel Neal Graham
North Carolina State University

Environmental Education: Rethinking Nature, Humans, and Human Nature

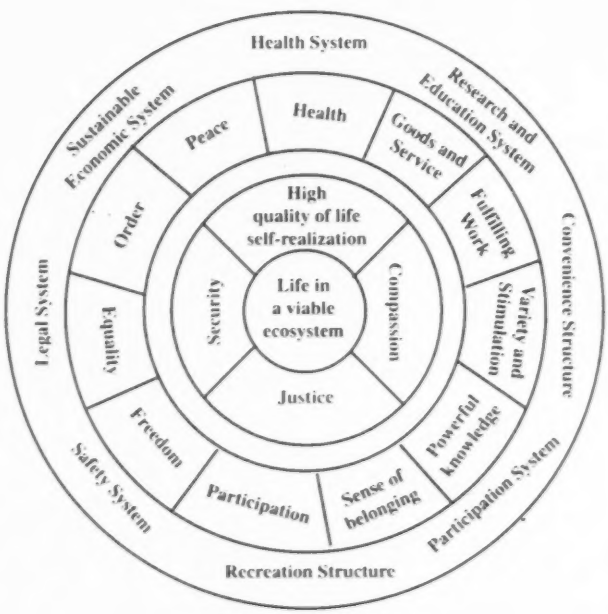
In the April/May 1995 issue of *On the Horizon*, Douglas Crawford-Brown raises an important question for environmental educators and others in related fields: *What shall we teach?* Implicit are some related questions: *How should we teach?*, *What do we think?*, and *How do we think?* Understanding the answers to these questions must take into account "...the motives behind the actions we take as humans, which in turn affects the way humans interact with the larger environment. To understand our role in environmental problems, we must understand our own minds" (Crawford-Brown, 1995, 10).

Lester Milbrath (1989) poses the challenge of an ecocentric perspective to critique the various components of industrial society he sees as materially unsustainable and spiritually alienating. Specifically he questions the: (a) environmental sustainability of unlimited economic and technological growth models, which create resource depletion and pollution overload of life-support systems; (b) polarization of wealth /income based on a lack of political and economic equality; (c) spiritual and psychological alienation resulting from the depersonalization and commodification of humans, other species, and the planet itself; (d) value-free claims of modern scientific and technological methodology at both the macro level (impact of political-economic-cultural framework), and at the micro level (limits of its reductionist approach, which isolates parts from wholes); and (e) desirability of the "Dominant Social Paradigm" that promotes *progress* as inherently good, without always asking where society is headed.

Milbrath's critique is complemented by an alternative "New Environmental Paradigm" based on ecology's lesson of interdependency among species and planetary life-support systems. His ecocentric model is illustrated in the figure. The central value is "life in a viable ecosystem," surrounded by four core social values: high quality of life, compassion, justice, and security. These are supported by various instrumental values, which are served by the outer ring of societal systems. All human systems (political, economic, academic, scientific/technological) are subsets of the planetary biosphere. Human thinking and actions don't take place in isolation from the rest of the world. Because we can never do merely one thing, we should develop the habit of asking "And then what ?" The cavalier use of DDT and CFCs are two well-known cases of ignoring these questions.

We need to move beyond dualistic either/or epistemology towards and/and wholistic thinking, and a new understanding of the relationship between parts and their whole—the whole (system) is always greater and more complicated than the mere sum of its parts.

Ecocentrism can be described as the rejuvenation of old wisdoms under new conditions, within an ecumenical framework that values diversity within humankind and among the numerous species of the biosphere itself. Ecocentrism re-emphasizes our connection to the rest of the natural world without ignoring the unique responsibility that technological prowess and self-consciousness have given to humanity. "Those given the gift of understanding will become the conscious mind of the biocommunity...that will guide the transformation (to sustainability).... Those who understand what is happening to our world are not free to shrink from this responsibility" (Milbrath, p. 380).



Source: Milbrath, 1989.
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[Crawford-Brown, D. (1995, April/May). The nature of nature and of the environment, *On the*

Horizon, 3(4), 9-10; Milbrath, L. (1989). Envisioning a sustainable society. Albany, N.Y.: SUNY Press.]

Ecology should be required like English, math, and science classes.

Implications

Not everybody is as activist-oriented as Milbrath, but all of us have the responsibility to be good educators. In a recent phone conversation, Milbrath agreed that environmental education should proceed along two complementary paths. First, there is a need for more environmental education classes at all levels of schooling, from Mr. Rogers and Big Bird to university programs. Second, environmental concerns must be integrated into the curriculum of related fields.

My Ecocentric Philosphy class at North Carolina State University challenges students to think differently about topics learned in other classes throughout the University. This class is in the Multi-Disciplinary Studies program, where courses such as Environmental Ethics and Science/Technology Policy seek to integrate interdisciplinary insights. There is almost always a core group of students from the Forestry School and other life science majors in these classes, who are interested in how their particular specialty is affected by political, economic, and cultural factors. Likewise, social science students learn more about how social systems are influenced by nature's cycles and health.

The Environmental Educators of North Carolina (EENC) started by Melva Okun and others from the Environmental Resource Program (University of North Carolina at Chapel Hill) has been actively pushing for more environmental studies in the state's elementary, middle, and high schools. More than 650 teachers and other environmental professionals participated in the state-sponsored NCEE Conference, held in the Research Triangle Park in December 1994, to discuss and promote environmental education, its content, application, fundings, and outreach programs.

Ecology should be required like English, math, and science classes. To be truly educated, we should know about the world in which we live. Dr. Milbrath has a new book coming out in late fall 1995, *Learning to Think Environmentally* designed for a broader audience than his 1989 offering. *On the Horizon* readers will be among the first to see a review.

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POLITICAL

Laurence R. Marcus
Rowan College

Rules Against Hate Speech Overturned Again

Based on a 1992 state statute that forbids universities from restricting speech otherwise protected off-campus, a California Superior Court judge has struck down Stanford University's anti-harassment policy (Associated Press, 1995). While Robert J. Corry, one of the nine students who brought the suit against the university, lauded the decision, contending that "students should not live in fear that what they say could get them expelled" (Shea, 1995), it comes as a blow to colleges and universities that have sought to improve the level of civility and intergroup harmony on campus by banning racist, sexist, homophobic, antireligious, and anti-ethnic group speech.

Collegiate hate-speech codes have been overturned in the federal courts on a routine basis since the University of Michigan's policy was thrown out in the late 1980s...

Collegiate hate-speech codes have been overturned in the federal courts on a routine basis since the University of Michigan's policy was thrown out in the late 1980s for violating the First Amendment by being vague and overbroad. Institutions were further constrained by the Supreme Court's decision in R.A.V. v. St. Paul, which overruled a city ordinance against cross-burnings and painting of swastikas, because the ordinance was not neutral in its content; government cannot forbid speech, verbal or symbolic, because it does not concur with the message.

Although Stanford is an independent university, it explicitly sought to craft its policy to meet constitutional standards, attempting to balance the free speech protection of the First Amendment with the equal rights and antidiscrimination protections of the Fourteenth Amendment (Grey, 1992). The code began with a clear statement of the university's policy on free expression, noting that students must learn to "tolerate even expression of opinions which they find abhorrent." The second section affirmed the university's policy against discrimination. The third section cited the conflict between the principles of free expression and antidiscrimination that might exist in certain instances, concluding that "protected free expression ends and prohibited discriminatory harassment begins" when the expression of an opinion becomes "personal vilification" of someone protected by the antidiscrimination policy. The fourth section narrowly defined "personal vilification" as speech (verbal or symbolic) that is intended to insult or stigmatize an individual on the basis of one of the characteristics noted in the antidiscrimination policy, is addressed directly to those insulted or stigmatized, and utilizes insulting or "fighting words," or words "commonly understood to convey direct or visceral hatred or contempt for human beings on the basis of characteristics specified in the antidiscrimination policy." The "fighting-words" reference is to the 1942 case of Chaplinsky v. New Hampshire in which the Supreme Court held that there is no constitutional safeguard for words that "by their very utterance inflict injury or tend to incite an immediate breach

The constitutionality of enhanced penalty provisions in response to bias-related victim selection provides colleges and universities the opportunity to make an unequivocal statement of institutional resolve in codes of student conduct.

of the peace." (This fighting-words doctrine has been narrowed over the years by the Court, making it increasingly difficult to meet the standard that would permit speech to be banned or punished.)

Some critics of the hate speech debate argued that Stanford's code did not go far enough to preclude all racist speech, having been drawn so carefully in order to weather attacks based on vagueness and overbreadth. Civil libertarians contended that the Stanford policy fell short, arguing that campus speech codes underpinned by a Fourteenth Amendment orientation would not meet the content-neutrality test of the First Amendment. In the end they were all right, and Stanford was unsuccessful in its argument that its own First Amendment right to prohibit unacceptable speech on its property would be abridged by the application of the state law to its code.

[Associated Press (1995 March 1). Court overturns Stanford code on bigoted speech, *New York Times*, p A25; Grey. (1992, September/October). Civil rights vs. civil liberties: The case of discriminatory verbal harassment. *Journal of Higher Education, 63* (5),485-516; Shea, C. (1995 March 10). Stanford anti-harassment policy violates rights of free speech, California judge rules. *Chronicle of Higher Education*. p A32.]

Implications

The ruling by the California court does not completely tie the hands of colleges and universities. Many institutions would like to place themselves on the record in clear opposition to acts and/or speech of hatred. In the 1993 Supreme Court ruling in Wisconsin v. Mitchell, the Court upheld a state statute that enhances penalties whenever a defendant "intentionally selects the person against whom the crime is committed...because of race, religion, color, disability, sexual orientation, national origin or ancestry of that person." Chief Justice Rehnquist, speaking for a unanimous Court, noted a difference between the ordinance that was struck down in R.A.V. v. St. Paul for not being content-neutral, and the one at issue in Mitchell, which was aimed at the nature of the penalty for conduct that is not protected by the First Amendment.

The constitutionality of enhanced penalty provisions in response to bias-related victim selection provides colleges and universities the opportunity to make an unequivocal statement of institutional resolve in codes of student conduct. Harassment may be generally prohibited, although specific references to harassment based on race, ethnicity, etc., may be made. However, the code may clearly state that there will be enhanced penalties in instances where it can be demonstrated that the victim was targeted as a result of racial, ethnic, or other specified bias.

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COMMENTARY

Higher Education, Community, and Civility

Andre Auger
University of Guelph (Ontario)

At present, most universities—especially those with significant residence populations—place considerable staffing effort on behavior development.

Universities, searching for a new identity, are focusing on new student markets and new approaches to learning. Among these is the vision of a university driven by and catering to a student audience not physically present on campus—with courses taught by CD-ROM, degrees via the Internet, student-faculty interaction via e-mail, and MUDs (Multi-User Domains) and MOOs (Multiuser Object Oriented domains).

What will the electronically-connected student gain in the "technoversity"? New markets, efficiencies, and opportunities? How will universities continue to meet their "civilizing" role for a nation's young people? Might the technoversity threaten this mission that, for many within higher education, remains an important mandate?

If our model of a university is that of an intellectual resource that provides active adult learners with access to the latest knowledge, theories, and research, then the question of electronic access creates no difficulty. If, on the other hand, the university is also a social institution that fosters the development of young adults into whole persons ready to assume a responsible role in the world of work, politics, family, and community, then the question takes on a whole new dimension. We need to ask ourselves to what extent the technoversity can continue to provide this function, and whether it might do so in the context of an atomized class of students linked with each other and the instructor primarily through the mediation of the computer.

At present, most universities—especially those with significant residence populations—place considerable staffing effort on behavior development. Ask residence life staff at almost any North American university about the greatest educational challenges facing universities today, and the topics will inevitably be: curbing personal violence, developing more positive ways to resolve conflict, fostering tolerance, encouraging a celebration of diversity, eliminating sexism and racism, inculcating more respectful sexual practices, teaching skills to cope with dysfunctional family histories, and promoting more balanced lifestyles and patterns of wellness to enhance human performance.

While these appear to have little to do with the academic heart of the university—the creation

I marvel at and applaud experiments in *virtual communities* and *virtual universities*, but I need to understand how on-screen experiences can replace actions and feelings that elicit responsibility or commitment to a group—an essential part of the community experience.

and the dissemination of knowledge—universities, perhaps despite themselves, are providing a "moral education" as a mission to respond to the times. Academic performance is in good part dependent upon psycho-social maturity. Moreover, society (and our funding agencies) expects universities to produce a new generation of responsible and productive leaders, thinkers, and politicians, and to foster the development of productive workers, enlightened and involved citizens, empathetic social leaders, creative problem-solvers, and useful scholars and researchers.

Those expectations imply some willingness to work for and within a community. Oversimplifying a bit, the past few decades have seen a considerable increase in dysfunctional behavior that can tentatively be described as originating in a youth population that combines a strong sense of personal rights with a weak understanding of community obligations.

Robert Bellah and his colleagues (1985) argue that American society has lost its understanding of the primacy of community and of the relationship between individuals and their communities, and has developed instead a vision of the good life in terms of individualism. The typical moral vocabulary of North Americans defines moral life in terms that identify the individual as the primary unit. Viewing involvement with others on the basis of individual relationships between pre-existing autonomous "monads" leads individuals to conceive of relationships on a "contractual" model. Individualism (a) does not provide any language for talking about situations that require perseverance and contribution to a community for the "public good," (b) is inadequate for engaging in true political discourse, and (c) reduces all social dynamics to notions of market exchange. A communitarian understanding of moral life for young people develops the critical tools to assess accurately and to contribute positively to the development of the fabric of society. Moral life in this context is primarily in interdependent relationships, worked out in public dialogue. The language of "public good," and [illegible] the notions of public virtue and character [illegible] prevailing force leading to desirable behavi[illegible] We need to learn a concern for "social ecology" ju[illegible]s we have learned a concern for natural ecology. each individual action affects others.

Colleges and universities group people linked by interdependence who need to develop the sense of cohesion to handle conflicts, live with disagreements, develop a sense of shared purpose, and act for a common good. Community is not the same as a "lifestyle enclave" of like-minded people getting together to reinforce their own views and their own needs. Community requires the recognition that its members are in some real sense subservient to the larger entity without losing themselves. True community requires that one see one's own needs in the context of the needs of the group. In activities where students are involved in face-to-face communities — from resolving conflicts of roommates, sports teams, service clubs, collaborative learning groups, and student government — they learn the lessons of give and take, compromise, having and measuring up to expectations, and sharing in and acting on common values and purposes.

I marvel at and applaud experiments in *virtual communities* and *virtual universities*, but I need to understand how on-screen experiences can replace actions and feelings that elicit responsibility or commitment to a group—an essential part of the community experience. On the Internet, I can, at best, become a member of "lifestyle enclaves" of people like me. At worst, I can engage in unbridled attacks against people I dislike. I believe colleges and universities must actively and intentionally pursue the teaching of communitarianism in the name of the societies they serve. Let us keep this learning objective in mind as we move our universities into the brave new world of cyberspace, lest we allow our losses to outweigh our gains.

[Bellah, R. et al. (1985). *Habits of the heart*. New York: Harper and Row.]

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METHODS & TECHNIQUES

David R. Hornfischer
Berklee College of Music

Sing a Song of Scenarios: Using Scenario Planning

Berklee College of Music in Boston, Massachusetts, currently celebrating its 50th anniversary, is the world's largest contemporary music college. With an enrollment of more than 2500 students, 35% of whom come from outside the United States, Berklee calls itself an international "music city," offering degree programs in every aspect of music including writing, arranging, performing, producing, recording, teaching and the business of music.

To begin to plan for the next 50 years, we looked both into the mirror and outward to potential external scenarios to form the basis for a strategic plan to meet the future needs of our international base of students.

We used the decennial accreditation process to guide our internal review via a comprehensive internal self-study. The study and subsequent accreditation review process identified a number of strengths and weaknesses of the college that serve as a guide to planning and assessment.

To evaluate the external environment, we turned to the scenario-based planning approach described by Peter Schwartz in *The Art of the Long View*. His firm, Global Business Network (GBN),

We selected the scenario process to evaluate our strategies against a backdrop of different external environments and to define a vision for the future that accounted for and addressed different conditions.

helped us use this approach, which was similiarly described in Ian Wilson's article in the February/March issue of *On the Horizon*.

As a tuition-dependent institution, we at Berklee defined maintenance of our 2500 student enrollment as the critical issue driving our instructional, administrative, space and financial planning. We knew, however, that we needed to look at various alternative external conditions that could affect our enrollment and broaden our view of the future.

For this purpose, we selected the scenario process to evaluate our strategies against a backdrop of different external environments and to define a vision for the future that accounted for and addressed different conditions. This approach enabled us to examine different options and to avoid making a single point forecast that might restrict planning to mere incremental changes to present strategies. At the same time, it discouraged planning for radical moves that might be effective only under a particular condition.

Working with GBN, we used a broad based review to identify critical factors that would impact enrollment. While many were internal, the two external factors that emerged were the overall world economic climate of the next five to seven years and the overall continued student demand for our programs. The analysis then identified and considered seven driving forces impacting these factors:

- State of the global economy needed to inspire confidence that future potential career opportunities will justify student/parent investment in a Berklee education
- National educational spending and priorities relating to a role for music education to foster support for early education in contemporary music
- State of the recording industry that employs many of our graduates
- Changing nature of musical literacy especially relating to the notation of music for guitar, drums and piano—the three most popular Berklee student instruments
- Changing faculty capabilities vis-a-vis remaining current with today's music technology and meeting the needs of a more diverse and less formally educated music student population
- Changing student population demographics, spending habits, and expectations
- Our ability to shape the musical landscape, as the largest independent college of music alumni base of over 20,000, whose careers are generally in the music industry

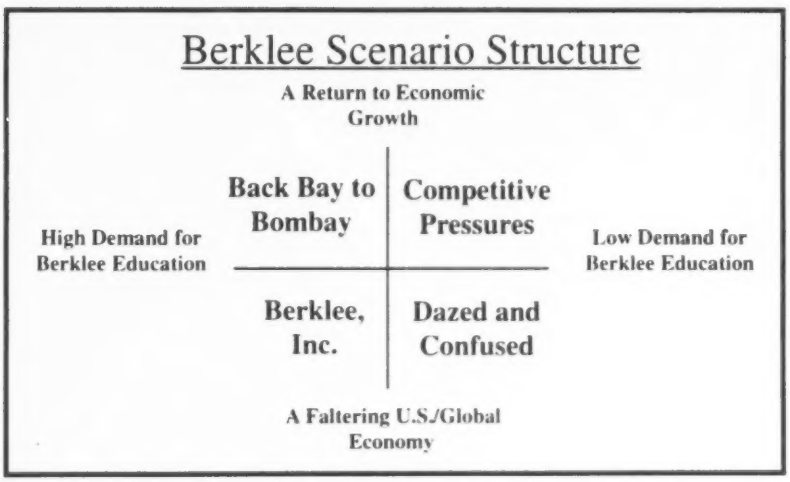
The analysis of trends relating to each of these issues led to a four-quadrant scenario-structure with two axes marking the demand for our programs as well as the overall strength of the global economy. Four scenarios were developed and named to give life to the alternative environments.

1. *Back Bay to Bombay* (High demand/strong economy) This is the good news scenario in which a rising economic tide coupled with strong demand for a Berklee education allow us to expand and become a truly global music college. A backdrop of solid economic growth of over 3% paves the way for a second Clinton term with a renewed sense of community and public purpose. The music business rides the economic tide and combined with increased diversity of music styles, makes Berklee's contemporary/technology-based curriculum ever more appealing to potential students from around the world.

2. *Competitive Pressures* (Low demand/strong economy) Here the economy is also strong, but pressures from other schools, as well as non-institutional, perhaps Internet-based, competition created by new technologies, diminish the attractiveness of a formal and expensive degree to a more business-aware student.

3. *Berklee, Inc.* (High demand/weak economy) While interest for Berklee education remains strong because of our contemporary curriculum, economic pressures make the cost even more burdensome. The impact of a weak U.S. economy growing at less than 2% is felt across the globe. Our government, overwhelmed by social and economic issues, reduces commitment to student aid programs. Berklee is forced to increase scholarship budgets to seek greater corporate support.

4. *Dazed and Confused* (Low demand/weak economy) This is the disaster story where a faltering economy, combined with the continuing diminishment of school music programs and a slumping music industry, put increased pressures



on our enrollment.

As Ian Wilson noted in his recent *On the Horizon* article (1995, February/March), scenarios focus our attention on the branching points of the future, thereby opening up to us the possibility of discontinuities and to the need for contingency planning.

We subsequently developed four components of a shared vision entitled *Creative Musicianship for a Changing World*: (a) maintain and assess our curriculum to assure implementing new technologies and teaching methodologies; (b) provide for increased student diversity; (c) improve campus life by strengthening our participatory collegial culture and our facilities; and (d) expand access to secondary collaboratives, post secondary consortia, international music education, and music industry relationships.

This visionary approach will lead to development of strategic operating goals within Berklee. These scenarios must, however, be continuously monitored against the actual economic and demand backdrop as they play out. Awareness of the significant driving forces will aid in that process.

[Schwartz, P. (1992). *The art of the long view*. New York: Century; Wilson, I. (1995, February/March). Envisioning (and inventing) the future. *On the Horizon*, 3(3),1-2, 5.]

TOOLS

Bernard Glassman
Pragmatix:Information Design

Keeping In Touch in the '90s

A number of review-worthy tools have accumulated over the year, among them ActionFax, Tele-Go, and Live Markup.

ActionFax

ActionFax is a central fax-modem and voice-prompt system that allows you to receive, store, and retrieve faxes via a toll-free number. You are offered the option of reviewing the list of waiting faxes, deleting those you have already seen, and forwarding one or more to another fax machine or even to another subscriber's mailbox. Think of it as voice-mail for faxes. The prompt system even tells you the page-count of the waiting fax—a blessing if you happen to be pressed for time or your hotel charges by the received page.

ActionFax allows your e-mail to be forwarded to your ActionFax e-mail address and downloaded to you anywhere as a fax.

ActionFax also has announced that it will be on the Internet by July, 1995. Among other features, it allows your e-mail to be forwarded to your ActionFax e-mail address and downloaded to you anywhere as a fax.

A basic ActionFax subscription, with 90 downloaded pages at no additional cost, is about $25 (U.S.). There are occasional specials and free trials through the airlines, so see if you can try before you buy. Call ActionFax at 1-800-725-1992 for more information.

The Tele-Go Phone

There are now hand-held cellular phones that can function as cordless phones around the house.

There are now hand-held cellular phones that can function as cordless phones around the house.

The Tele-Go is smaller than the MicroTac from Motorola, and it has a better display. As just another cordless, it's much clearer and farther-reaching than any but the new, expensive 900 megahertz phones. I can walk the dogs several hundred yards without losing the ability to receive or make calls using my home phone line, and I can also receive calls made to my Tele-Go number. These functions are at no charge, because while it is being used as a cordless, calls to the Tele-Go number are automatically forwarded to my home number. When I get out of range of my house, the Tele-Go locks onto a cellular antenna in the area, so it can continue to receive calls to the cellular number. It has an amazing 25 hours of standby time, or about two and a half hours of continuous talk time. GTE offers call-waiting, voice-mail, call forwarding, and conference calling as adjuncts to the phone. With an adapter, the phone will accept the cable from your fax machine or fax-modem. This means cordless faxing and e-mail availability from anywhere around the house, and cellular connections elsewhere. And it can also be a security phone to take along in the car.

At 25¢ a minute, the airtime on the Tele-Go is about right for quick calls to a client or colleague, but as yet, it is not very reliable for roaming into other cellular markets. On a trip to Washington, D.C., it was useless. On a trip to Philadelphia, I got through to the roaming network with a nice clear signal, but was required either to give the operator a Mastercard or American Express number, or to call collect. From there, it's $1.95 per minute anywhere in the U.S. On my U.S. Air flight from Philadelphia to Raleigh-Durham, stuck for an hour on the runway with no AirPhones on board, my Tele-Go collect call home went through flawlessly. At about nine ounces, it's well worth dropping in the briefcase.

Tele-Go costs $18 per month, with no contract and no hardware purchase necessary. Call Tele-Go at 1-800-TELEGO to learn when it will be available in your area.

The HTML Sourcebook

The HTML Sourcebook is a superb guide to HTML and to all the finer points, such as allowing people to send you e-mailed comments while reading your home page, looking up something in a database, and offering drop-down menus, even to the reader who is browsing your page with Lynx. If you've considered setting up a page for your department but weren't sure how, this book

You'll be creating nifty pages, including links to other pages, quickly and easily. Live Markup is tryoutware that upgrades upon registration into a more robust product.

should remove any hesitation.

[Graham, I. S. (1995). *HTML sourcebook*. New York: John Wiley & Sons. Inc. $29.95 (U.S.)]

Live Markup

To avoid the more tedious writing in HTML, lots of text-editing software now permit you to highlight portions of a page of plain text and turn it into HTML elements. The best of these are WYSIWYG—what you see is what you, or the person who connects to your site, get. The best of the WYSIWYGs at the moment is called Live Markup. Still a work in progress, it does what it is designed to do. You'll be creating nifty pages, including links to other pages, quickly and easily. Live Markup is tryoutware that upgrades upon registration into a more robust product. Check the developer's homepage at http://www.mediatec.com/mediatec/ to download a copy for your Windows machine (a Mac version is in the works).

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Accessing *Horizon List* and *Horizon Home Page*

If you have access to the Internet, you have access to *Horizon List* and *Horizon Home Page*. To become a participant on *Horizon List*, send the following message to listserv@unc.edu

subscribe horizon <yourfirstname> <yourlastname>

To access *Horizon Home Page*, if you have a graphics-supporting browser (e.g., Netscape, Mosiac), point it to the following URL:

http://sunsite.unc.edu/horizon

If you do not have such a browser (e.g., you use a modem to dial into your host site), and you do not have access to a SLIP or equivalent connection, you can browse the text of *Horizon Home Page* as follows:

When you log on your e-mail server, at the UNIX prompt (%), type:

telnet sunsite.unc.edu

Hit return. You will get another UNIX prompt. Type:

lynx

Hit return. You will then be asked for your terminal emulation, which should be set to vt100. Type:

vt100

Hit return. You are now in the SunSITE index. Use your down arrow to get to *On the Horizon*. Use the right arrow to enter *Horizon Home Page*.

The directions for navigation within the home page are at the bottom of your screen. You're now in our Web site; browse to your heart's content.

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